Business location in developing countries.

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THESIS

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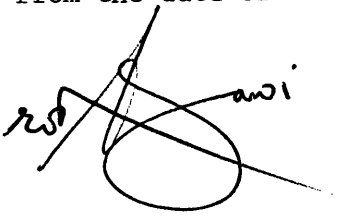

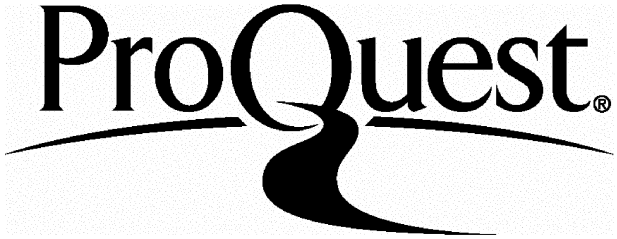

TO MY PARENTS

"In searching the unknown for new truths there is mystery, there is adventure, there is the thrill of discovery ... Research is a hard mistress, but her rewards bring satisfaction that few of us would forgo."

Snedecor, 1950 *

*Statistical Methods. The Iowa State College Press.

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During the course of preparing this thesis many people have been very encouraging and co-operative. To all of them I owe great intellectual and emotional debt.

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ABSTRACT

The inception of this study was stimulated by the increasing awareness of developing countries of the importance of striking the right balance between concentration and dispersal of economic activities. It has been slanted towards the Sudan, where frequent failures and inefficiencies of planning of business location due to the ad hoc and crude locational policies manifest themselves in a number of ways. Hence the study seeks to elucidate the following issues: (a) To understand the existing pattern of industrial location and find points of similarity and/or departure with different location theories. (b) To identify the main determinants that influence locational decision. (c) To examine the role of the government and its different forms of intervention. (d) To identify the stages of locational decisions with an interest of showing the place of these decisions within the dynamic process of planning. Consequently, a framework was devised with an eye on meeting the above objectives and conducting the study on a systematic way. The investigation was based on personal interviews with managing directors in the private and public sectors as well as government officials. Use was also made of published materials.

To skate quickly over the major findings, the study indicates that the normative approaches to the problem of location, whose central objective is the determination of the optimum site that maximizes profit is too restrictive when applied to a country like the Sudan due to the complexity of factors involved. Equally, the role of the government is too obvious to be ignored, and hence one cannot dismiss the relationships between the macro and micro perspectives. As a

corollary to this, the disparity in the relative significance of location determinants in developing and developed countries has been highlighted. Congruous to other developing countries, the pattern of industrial development in the Sudan, presents a case of limited industrial concentration in few urban centres. This state calls for proposing a flexible approach to planning of business location which takes account of two important aspects. (a) The first is an articulate investment policy by the government in key cities, suitable from an economic point of view, by provision of basic services that should be planned in close association with the policy of planning of business location. (b) Lest that trickling down effect may not make a positive impact in the lives of the majority of rural population, there is an urgency in developing rural centres.

CHAPTER ONE

CHAPTER ONE

INTRODUCTION

Although two centuries have passed since the industrial revolution, most of the world remains poor and still suffering from the ills of underdevelopment. To Bhogwati[1] "Nearly two-thirds of the population of the world subsists on substandard incomes. Illiteracy, bad housing, lack of medical care and malnutrition are prevalent throughout most of Asia, Africa, the Middle East and Latin America." This appalling situation presents challenges to developed countries, international organizations, developing countries and researchers.

The political instability of certain developing countries, caused by the magnitude of the internal and external challenges is a source of uncertainty for the world economy as a whole. The war in the Middle East, and the socio-political upheavals in Iran, are points in case. Moreover, the interdependence between human societies is growing rapidly at the world level and has reached a point never previously attained: the Saudi Arabian and Gulf States oil is an example which demonstrates this interdependence. It follows therefore, that it is in the interest of the developed countries to devise active strategies with regard to developing countries, strategies which are based on the co-operation between developed and developing countries and increase of technical assistance to developing countries.

On the other hand, international organizations have been very much concerned about advocating policies which are designed to eradicate poverty, reduce inequality and problems of unemployment. For example, the Second General Conference of Unido held at Lima in 1975, faced with the fact that 93 per cent of industrial production was concentrated in industrial countries having less than one-third of the world population, formulated the "Lima Declaration and Plan of Action on Industrial Development and Co-operation" in order to reduce inequalities in the present distribution of income, wealth and industrial production between the different countries in the world. The main issues for the Third General Conference which was held at New Delhi from 21 January to 8 February 1980 were concerning industrialization of the Third World.

The challenge facing developing countries is obvious. Most of these countries emerged after the Second World War from a long colonial era with great aspirations for social transformation, social equality, high levels of employment, more equitable distribution of income and a well balanced regional development. In short, they are looking for relief from the problems and unhappiness of underdevelopment they suffered for long years. A decision, therefore, has to be taken which defines the path of their economic development and reflects their aspirations for a new life in the short and the long run.

Finally, it is not surprising that the distresses of underdevelopment have caused such great concern that researchers have emerged to examine the central issues raised by the above affliction through reasserting the development priority and reshaping development policies.

It may be misleading to divide the world into two homogeneous and distinct categories: namely developed and underdeveloped. Indeed, individual countries in each group exhibit such wide diversities because of the cultural, social, economic, technological stage of development and political particularities of the various societies and the ways in which they react to internal and external pressures.

Regarding developing countries, two lines of evolution can be noticed. First: underdeveloped countries are characterised by political and economic similarities that make them more distinct in many significant respects from developed countries(2). One major similarity of underdeveloped areas is their massive poverty caused by low productivity. To add insult to injury, a large proportion of the peoples in these countries are kept in 'absolute poverty' and that they lack the basic human necessities. Other major similarities are the coexistence of a modern sector and a traditional sector, the birth of a relatively privileged class, rapid urbanisation, etc.

The second line of evolution is that underdeveloped countries are progressively becoming more differentiated and heterogenous because of economic and social conditions, cultural heritage and the ways the societies react to opportunities and trends arising from internal and external pressures. To illustrate the point, we find some countries are in the process of becoming full industrial states and are already providing decent standards of living for their population. Whereas other countries are unable to develop their agriculture and their populations are suffering from malnutrition. Brazil and Mexico are becoming industrial states, while Bangladesh, Rwanda

and Madagascar are having negative rates of growth. South Korea and Taiwan are achieving more than five per cent per year growth rate whereas the rate is 0.7 per cent for Bolivia and Ghana, Per capita incomes range from $110 in countries like Bangladesh, to $15,500 in Kuwait. Population sizes in different countries exhibit great diversity ranging from hundreds of millions in India to thousands in some Arab rich countries. Finally, there is an immense disparity in the availability of natural resources capable of financing the imports needed for development.

Thus, the above significant diversities suggest that there is a need for not adopting too generalised an approach for development strategies in developing countries. Each country is to be examined in accordance with its own particular circumstances, comparative advantages and stated objectives. A word of caution is perhaps necessary. Industrialization, albeit glittering with hope, is not the only means to achieve economic progress. It is essential to recognize that, while the industrial sector may be the most crucial and dynamic sector in the economy the path to industralization, and thus to the transformation of the society and fulfilment of economic and social objectives, is very long and involves a highly complex process. Furthermore industrialization does not exist in a vacuum, as a close relationship exists for instance, between industry and agriculture. If a country is to achieve transformation of its economic structure into a more efficient system which is characterised by diversification of output and social justice, industry, central though it may be, is envisaged as being complementary to other sectors. The need of the developing countries to industralize is essential. However, it is important for the pattern

of industrial development to fit into an overall strategy of development to achieve the economic and social objectives set by the State. The next section discusses the rationale for industrialization.

The Advocacy for Industrialization: The 'wide' and sometimes 'tragic' gap between developed and developing countries requires that developing countries must 'leap across the centuries'. However, they cannot make this leap without the help of advanced industrialized countries, whose wealth of accumulated knowledge and experience make them well equipped to provide such help.

Acknowledgement of this aggravated gap, explodes an important assertion which is also a substantial advantage to developing countries; as a result of scientific and technological advances, emergent countries do not need to follow the slow and laborious path of developed countries which started in the 19th Century. They can profit from the mistakes, as well as the successes of the developed countries. They can today choose from the amazing new methods which today's technology offers.

The major argument for industrialization is that most underdeveloped countries rely heavily on the export of small numbers of agricultural products. For example, the dominance of cotton in Sudan's economy. This dependence on one product, it is argued, makes the economy precarious because any adverse changes in world demand, or volume of production, may undermine the economic position of the country. Therefore, "many of the underdeveloped countries in their efforts to achieve a more stable economy and a better standard of living,

tend to give manufacturing industries the highest priority."[3]

Another argument put forward is that industrialization promotes a greater sense of confidence and self reliance among the developing countries, which have hitherto suffered from excessive dependence on others. Besides, the satisfaction of requirements to a greater degree, industrialization also creates through the web of relations between countries solid foundations for co-operation among countries.

Observing these objectives the people of developing countries have naturally come to believe that in order to achieve greater security and a higher standard of living, their countries must allow industry to play its role as a major sector of the economy within the framework of the overall development strategy. The underdeveloped countries have long been mainly producers of raw materials and they have come to know that there is a strong connection between the wealth and the standard of living of a country and the degree of its industrialization. One does not need to push the case too far, as sometimes this argument is not showed by all developing countries, as despite overconcentration on industrial development, the economic and social gains are below their expectations. The defeat of such an argument is its apparent oversight of the fact that industrialization by itself could not achieve economic growth, and that if stated objectives could not be fulfilled, industry should not be blamed.

P Baran[4] argued that industrialization has to be given top priority in any economic development plan. Another important study which relates both economic development and industrialization was

carried out by Harbison and Myers[5]. Harbison and Myers argued that industrialization is almost the universal goal of modern nations. They maintained that the industrialization process has its own set of imperatives; that is to say, the things which all societies must do if they hope to conduct a successful march to industrialization. One of the imperatives in the logic of industrialization is the building of the requisite organization to combine natural resources, capital, technology and labour for production processes.

Professor Raoul Prebisch[6] advances a further argument for the case of industrialization in underdeveloped countries. His argument rests on the contention that an underdeveloped country's demand for industrial goods increases more rapidly than does the foreign demand for its exports. In such a case, he advocates that the country must supply all those industrial products which it cannot import because its exports grow at a very slow pace. Now, if all the assumptions of Professor Prebisch are granted, "namely that industrial goods are crucial and must either be produced locally or imported, and that the country has no other ways or means of increasing its ability to import ..." then there is indeed a very strong case for industrial protection and import substitution.

But these are formidable requirements. For one, a developing country's capacity to import industrial goods will depend not only on its export earnings, but also on the inflow of foreign capital, changes in the terms of trade and the country's capacity to replace other imports - especially food imports - with domestic production. Thus, to the extent that these factors can increase the country's

ability to import, the need for industrial protection is minimized. For another, what is relevant for individual primary exporting countries, however, is not the overall income elasticity of demand for primary products, but the prospects for their individual exports; and it is unreasonable to believe that export prospects are equally unfavourable for all raw materials, minerals and foodstuffs.

Even if it is decided that import substitution is the most socially profitable policy, complications and problems arise. For as Professor Meier[7] noticed "... if such a protective commercial policy is designed merely to replace imports; this in itself is no guarantee of cumulative growth." This is because even if import substitution is successful, the problem of sustaining the growth momentum beyond the point of the capacity of the home market is not solved. The question of import substitution is, to quote Professor Chenery[8] "The most important and the most difficult aspect of developing planning."

A different argument that has been put for industrialization is based on the need to provide employment outside the agricultural sector. Industrialization is needed to absorb manpower that becomes redundant as a result of increased productivity of the land. This argument has very strong historical support in countries like the United Kingdom, France, Germany and Russia. However, the policy failed in some south east Asian countries, and resulted in their disenchantment with industrial growth. Industrialization should not be blamed for the failure; but it is the inability of these countries to promote labour-intensive exports on a substantial scale. Singapore is an exception as its export-oriented industri-

alization policies have transormed unemployment levels into negligible unemployment in 1966/67; its manufacturing work force grew by an average of 23.1 per cent when the impact of their export promotional policies started to work[9].

Having argued the case for industrialization, it goes without saying that planning of industrial location is an important factor for which planning and control are essential. Sometimes the choice of the site is predetermined by the nature of the industry itself. Thus the surface installations of a coal mine are usually above the pit. For other industries, nearly always a conscious selection of site has to be made. New techniques in transport, communications and power transmission enlarged the field of choice and invalidate the old limitations on location. Developing countries can always avoid the mistakes of developed countries as well as profit from the vast experience of these countries. However, one must remember that developed and developing countries do not constitute internally homogeneous groups. These two groups can be subdivided according to (a) the level of economic development, (b) the economic and social system, (c) the size of the country, (d) the density of population. It is quite clear that for the locational policies of India, the experience of the Soviet Union has a greater validity than that of Belgium.

If the locational experience is compared regionally, there is a much greater choice. The examples of industrialization of under-developed regions in Poland, Yugoslavia and Italy can be cited. The experience in these regions will have some validity for selected regions in developing countries, where economic and social conditions

have certain elements in common with conditions in regions in developed countries.

Three problems of regional economics are of importance to the developing countries. The first problem concerns the validity of the developed countries' experience in the field of industrialization of underdeveloped regions and the utilization of such experience by developing countries. The key role of this factor is explained by the fact that the technological, economic and social experience could be applied in promoting parallel industrialization of regions in developing countries. The second problem which requires more investigation is the development of industrial growth poles. This concept is nowhere truer than in Africa, where the growth of the 'primate city' has gone together with economic development in the continent. According to Hance primate cities in Africa are "the intellectual and social capitals, the seats of governments, the main foci of political activity of all sorts, and the economic capitals of their respective countries; the major transport centres; the major financial nodes; and they contain the vast bulk of the newer market-oriented manufacturing establishments as well as a considerable share of the raw material oriented plants. Indeed, one of the notable characteristics of many African countries is the rapid fading away of the signs of modernity as one leaves the urgan centres."(10) So it has been argued that in order to lift the economy to higher income levels, one or several regional centres or growth poles must first be developed(11).

Thus, much attention in the past decade has been given to the problem of industrial states. However, the main difficulty in the

field of industrial location in developing countries is that of establishing or developing nuclei of industrial growth and not that of the physical layout of industrial states.

The final problem is the proper spatial co-ordination of industrial and urban growth. This is really a difficult problem as the rate of urban growth in many developing countries is higher than the rate of industrial growth. To create new jobs in the metropolitan areas by encouraging the location of additional industries in the over-congested areas, does not change the existing situation in other areas of the country. It is therefore arguable that new poles of growth should be established outside the over-congested areas in order to create other points of attraction for migration movements. It is clear that in both developed and developing countries, one of the imperative conditions of the proper solution of the problems of industrial location is the elaboration of a programme of regional economic development as it solves the many problems of congested regions, the spatial co-ordination of economic activity and infrastructure investment and the spatial co-ordination of industrial and urban growth.

Although some few developed countries stated interest in spatial planning of economic activity before the Second World War (Britain for example, started the process as early as the 1930's, as a response to high levels of regional unemployment highlighted by the world depression; the British government established the Barlow Commission in 1936), the main acceleration of regional development took place after the Second World War. This has been due to two main reasons. First, certain regions were suffering from acute social

hardships. To cite some examples, France incorporated a strong regional element into their planning system[12]. In Italy too, the regional element was introduced after the war as the country was divided into two disparate halves, and hence indistrial investment and the development of infrastructure was to bring the economy of some regions into the twentieth century[13]. And Britain followed the Barlow Report by a series of measures aiming at dispersing industry through the establishment of Industrial States and tax and discouragement of manufacturing in congested areas[14].

The second reason was the fact that industries were concentrated in a few towns and there was always the fear of insoluble environmental, social and economic problems. To that end, regional problems were political priorities which could not be ignored. In Britain, for example, every effort was made to curb the growth of large conurbations.

By contrast, in the Third World countries at the threshold of their development, where symptoms of underdevelopment, which include poverty, disease, illiteracy, short life-expectancy and much unhappiness were very clear, regional problems seemed to be less urgent, and their main concern was rapid industrial and agricultural developments. However, with the passage of time, the picture began to change as they realised that regional development was an appropriate concern for them. Friedmann[15] argued that regional planning is an essential requirement at an early period of economic development, as without it, opportunities for natural resource development might go by default. To quote him, "transitional societies are clearly most directly concerned with regional

organization, partly because of the spatial shifts involved in moving from an agrarian to an industrial economy, and partly because a large portion of their potential resources are still unutilized."[16]

The innumerable schemes for promoting industrial dispersal in Latin American countries is a clear evidence of their interest in the regional approach for development. These schemes reflect the strong feeling that metropolitan growth should be slowed and poorer regions assisted in their developments[17]. Two-thirds of the population and production of Latin America are concentrated in three countries - Brazil, Mexico and Argentina - which are amongst the five biggest industrial producers in the Third World.

In Asia and Africa the regional development phenomenon is less fully developed, however, it is gaining momentum. India, is one of the Asian countries which accepted the goal of balanced regional development as early as 1956. According to Kuchhal[18] such a policy yields results over a fairly long period. Nigeria, Tanzania and Kenya are examples of African countries where regional development is growing in importance.

Needless to say, the Sudan displays an example of a typical under-developed country. Its problems depict perfectly the features of under-developed countries (low per capita income, uneven distribution of population, rural population comprises the majority, underemployment is a common phenomenon). Prior to the Second World War, there was zero industry apart from a narrow range of small "residentiary" industries[19], eg shoe-making, manual thread-making, weaving by

locally made factories, and other things produced by primitive means without the use of machines. Consequently, there was no problem regarding selection of sites due to the nature of the industry which was very primitive and the logic behind it was to give safe employment to capital under the watchful eye of the owner. During the Second World War, the colonial authorities fomented the production of import substitution and most of these industries were located in Khartoum area; ostensibly, there was enough space to accommodate them. This period did not witness any policy for industrial development and hitherto Sudan was run as an economic satellite providing textile factories located in Manchester and Liverpool with cotton.

The post-independence period has been characterized by heavy concentration in the metropolitan area of Khartoum, with almost no industrial base elsewhere. This phenomenon is more or less similar to Friedmann's concept of "Core-periphery" relationship which stresses the existence of a polarized spatial structure with a strong centre that dominates the spatial structure of the country(20). Khartoum province in this case is the centre of production and consumption which uses other subcores as hinterlands(21). Moreover, development plans ignored the spatial aspects of the development process; as resources are allocated to the different sectors of the economy. But this is absurd as any human activity takes place in time and space and thus it is inappropriate to neglect the space dimension of development.

With an eye on the above problem, the study was launched to shed light on a number of issues which will be detailed in chapter three

as part of the research framework. However, a brief note here will not spoil our organization. The prime objective of the study is exploratory in the interest of understanding the planning of industrial location in developing countries. The analysis is more slanted towards the Sudan for two reasons: the first reason is that the writer is more informed about the Sudanese experience in planning of industrial location, and hence better qualified to analyse the stock of the situation. Secondly, it is hoped that such analysis will be of use to planners, particularly as attempts are now under way in my country to adjust the locational maladjustments.

Organization of the Research

Following this introductory chapter, Chapter Two depicts the theoretical aspects of the study as identified in the literature in a way that serves as a background to the discussion of the different issues of the research. The writer elected to deal with the development of industrial location theory from its beginning, passing through the different models and ending with the complex factors governing industrial location in the real world. Needless to say, the chapter comprises a large number of empirical studies which provided an overall picture of the experience of developed countries in the application of various critiera for industrial location. Towards the end of the chapter we have constructed a model which will help to identify all the factors involved with respect to the selection of the site. It shows that the location decision is a part of an on-going strategy rather than an isolated event.

Chapter Three outlines the research methodology where a brief

account of the different field methods is given. It also shows the rationale for the framework adopted to conduct the study. The reasons for choosing Khartoum for the empirical survey are discussed.

Chapters Four and Five give a highly selective general background and review of the major economic sectors; thus they set the environment within which the study is built. It is hoped it will be of help to the Western reader who needs to be more informed about the various aspects of life in the Sudan, its evolution, present structure and futur prospects. Chapter Five, in particular, reviews the major sectors of the economy and shows in what ways the traditional management of the economy exhibits weaknesses.

Chapter Six deals with the determinants of industrial location. Besides discussing the pattern, it also discusses the relevance of the location theories to the Sudan. The main thrust of the chapter is to isolate the dominant factors influencing location in the Sudan.

Chapter Seven deals with the impact of the government in the planning of industrial location. Answers are sought to two key questions. Firstly, what are the main forms of government intervention designed to influence the investment location decisions? Secondly, what are the required key policies to correct the present situation?

Chapter Eight deals with decision making process regarding the location of the plant; an attempt will be made to outline the various stages of the planning and decision processes. It shows how the private and public sectors exist in a negotiated environment. It also

outlines the motives involved at macro level which dictate the decision to locate the third largest sugar project in the world in Rabak area. The chapter is capitalizing on the discussion of the previous chapters and hence, it is seen as an attempt to pull the threads together for the purpose of showing the place of location decisions within the dynamic process of planning that goes in the Sudan.

Conclusions on the study will be given in Chapter Nine where a summary of the main findings and future implications and suggestions for future research will be dealt with.

CHAPTER TWO

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Despite reference to the location of industry in the early writings on economics, classical economists in general ignored spatial aspects and "their formal analysis was related predominantly to a static, spaceless world (or what Isard calls a 'wonderland of no dimensions').[1] Indeed, in the writings of Adam Smith, John Stuart Mill and Ricardo particular aspects of location were mentioned. However, they did not consider location to be a problem deserving particular attention. The emphasis was placed on historical, sociological and economico-geographical bases. A. Ure pinpointed in "The Philosophy of Manufacturers" (1835) the main reasons for industrial development. He mentioned cheap fuel, abundant population, and vicinity to seaports as agents promoting the development of industrial enterprise. But on the whole he did not attempt to formulate a comprehensive theory, or to relate location to any of the fundamental problems of economic theory. The classical economists did not recognize a problem, while those lesser writers who did could not see its implications.[2]

Alfred Marshall[3] tried to integrate differences in cost due to location into general equilibrium analysis, using the concept of the

'situation value of an enterprise'. But, though he recongized the existence of a problem, and provided the rudiments of a theory of location, he did not give much guidance for its development and completion. His work primarily emphasised the influence of time, rather than space, and the majority of Anglo-Saxon economists, in the half century to follow have followed his path.(4)

By the end of the 19th century, two specific treatments of location emerged. Firstly, the realistic and descriptive approach. The writings of A.E. Ross in (1896) and F.S. Hall in (1900) provided the first important contribution to this approach. Ross analysed only rational and economic elements (raw materials, labour supplies, markets etc,) as being the forces that determine the location of industries. "If we seek what determines location, not of a single enterprise, but a cluster of like enterprises, or of an entire industry, the non-rational or personal causes are eliminated; and our enquiry lies almost wholly in the field of economic advantage."(5)

But the results of his analysis were neither a theory nor is it by any means an adequate descriptive study.

Hall analysed the regional distribution of employment in 15 industries, all of which were highly concentrated in particular areas. To him, the exact point of localization was a matter of chance decision made by some pioneer in the industry. After this "the manufacture gains a momentum which enables it to persist in the original locality long after the earlier general advantages have disappeared."(6) Other writers adopted the same method of approach.(7) But neither of these studies attempt to construct a general theory of location, ie, the

incorporation of spatial and regional economics into the general body of economic theory.

Secondly, the deductive and analytical approach, developed in Germany. It is due to the work of three Germans: Laundhart[8], Von Thünen[9] and Weber[10], that we find the first real attempt to formulate an analysis that would explain specific as well as general location problems. Their ideas figure prominently in the industrial location literature; and would lead us to discuss the various models of industrial location. The first model is the Least Cost Theory.

2.2 The Least Cost Theory

The first theories of industrial location modified the normative theory of the firm by adding a spatial component to the formerly non-spatial economic world. This modification was the key to the understanding of economic activity in space. It is worth noting here that the normative assumptions of classical economic theory were not modified and hence the firm was assumed to want to maximize its profits, to know of all possible alternative locations and to be able to rank these in terms of economic expectancy.

Laundhart explained the location of industry as the decision resulting from two variables; namely, differences in cost and demand at alternative locations. He concluded in his model that the least costs were a prime factor in location decisions. Loria[11] argued that the location decision was based on maximum profit. But both failed to achieve sufficient generality in their analysis.

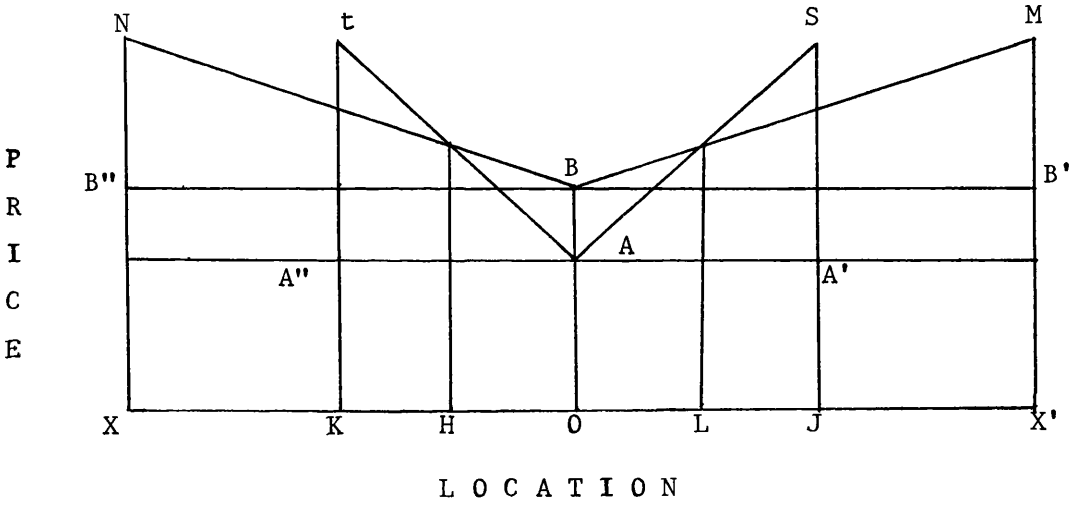
Von Thünen was concerned primarily with agricultural production. His

work is vital as we find the first real attempt to formulate an analysis that would explain specific as well as general location problems. His theory, though designed to explain the type of crops that would be grown at places of varying distances from the market, is applicable nevertheless to manufacturing locations. He attempts to explain certain problems of location in the light of the theory of rent, ie, cost differences of a commodity at alternative sites are due to the land rent and the transportation expense.

As regard labour, Von Thünen mentioned two possibilities - labour could be considered equal in skill and cost everywhere and hence is irrelevant in the locational decision; or a disparity in labour cost could be assumed as given and thus the differential appears as land rent.(12) Von Thünen's argument is suited to presentation in a graphical form. In figure (2.1) OA is the production cost of a dollar's worth of potatoes and A'S (and A''T) is the cost of transporting the product over a distance of OJ (OK) miles. OB stands for the production cost of a dollar's worth of wheat while B'M (B''N) represents the freight charge over a distance of OX' (OX) miles. Clearly the freight rate is higher on the first than on the second product. Since the cost of production is everywhere the same, the land rent and the cost of transporting the goods are thus the co-determinants of location. The producers of potatoes will be found in the OL (OH) region, while wheat will be grown between LX' (HX).(13)

The model of Laundhart did not become known to western industrial circles until after its modification and development by Weber in 1909. His approach was procedurally opposite to that of Von Thünen,

Figure 2.1



where the starting point is a given location, and concern is with the type of activity. Weber, on the other hand, assumes the branch of industry as given and then proceeds to determine the optimum location. Another difference between the two approaches is shown by Von Thünen's assumption of a homogeneous land surface and one consuming centre, while Weber assumes heterogeneous land surface and several consuming centres.

There are three general determinants of location in Weber's theory, namely the relative cost of transport, labour costs and "agglomeration". According to Weber, the first two are regional factors, which are susceptible to deductive analysis, and the third is a secondary factor which can only be treated inductively because it is largely accidental. The model advocates locating the factory at the point of least transport cost but when differences in labour costs are introduced the basic network is altered.

The degree to which the industry is raw material or market oriented is an outcome of its Material Index (M.I.) or Locational Weight (L.W.) where (M.I.) = Ratio of the used localized material to the weight of the whole product.

(L.W.) = Weight of the final product plus the weight of the material used.

These two measures are an indicator of the location where transportation costs may be minimized. As the material index is approaching zero and the Locational Weight is One the location is market oriented. On the other hand the higher the location weight the greater the attraction of the material sources. A good example is the location

of pig-iron manufacture in the 18th and 19th centuries, when as much as eight to ten tonnes of coal were required to produce one ton of pig-iron. At this period, most pig-iron manufacture was located on the coal fields. Products which involve either an increase in weight or are fragile and therefore expensive to transport are best located near the major markets. In discussing "Tendencies in Actual Development", Weber attributed spatial concentration of activity which came about in the late 19th and early 20th centuries[14] to the capitalization and mechanization of industry. He states

> "In the long run, then there must come about a fundamentally new orientation of the new large units of production which have been created by these combinations. This new orientation may come about slowly, because of the enormous fixed capital which is involved in a dislocation of these industrial giants and which give great weight to their location as it developed historically ..... . This will complete the locational revolution which was started by the recent development toward concentration."[15]

Weber's analysis is based on the following assumptions:

(1) The unit of analysis is a single, isolated country, homogeneous in terms of climate, topography, race, technical skills and under one political authority.

(2) That the firm under consideration seeks to maximize profits and therefore minimize costs.

(3) There is perfectly competitive pricing.

(4) That transport rates are homogenous while transportation costs are a function of weight and distance.

(5) There are given buying centres and given demand.

(6) The geographical basis of materials is given.

(7) There is a given basic distribution of labour, ie, labour is immobile with an unlimited supply at a given wage rate.

In addition to the role of transfer costs in the location of industry, Weber realized that labour exerts a location pull. Such a case occurs when the saving in labour costs are more than the additional transportation charges.

The third factor considered by Weber is the "agglomerating" or "deglomeratory" force which tends to draw industry closer together or disperse it. To state the concept graphically, suppose there are three units of production putting out a like product, located as in figure (2.2) at P_1, P_2, and P_3. Each location is a point of minimum transport cost for its respective unit in assembling required raw materials, and transporting the finished product to the units market. Around the location of each unit are drawn the units triangle and critical isodapane. In figure (2.2) the critical isodapanes do not intersect. Agglomeration is not feasible. In contrast stands the situation depicted by figure (2.3) where these same three units are

Figure 2.2

Non-Intersecting critical isodapanes : no agglomeration

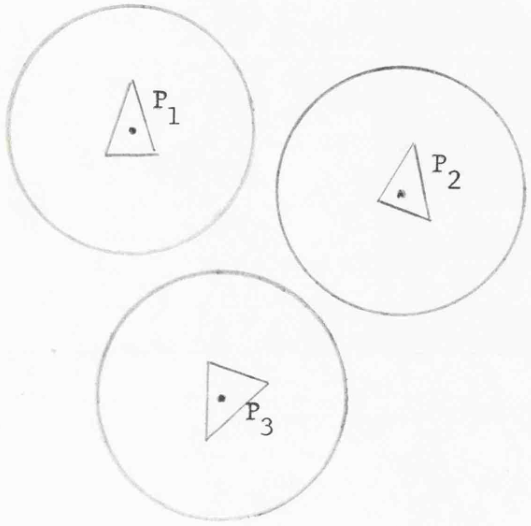
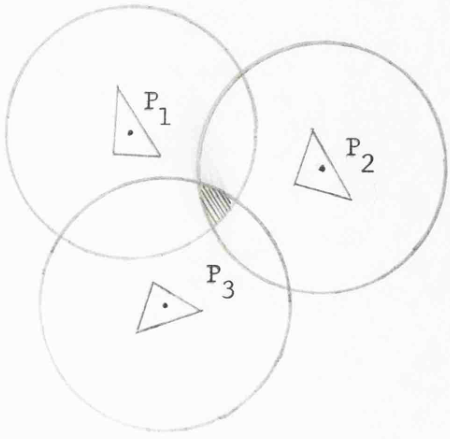


Figure 2.3

Intersecting critical isodapanes : agglomeration



closer to one another. Here their critical isodapanes do intersect, and agglomeration will take place at a site within the common segment which is shaded.

An agglomerative factor is an advantage, which results either by the expansion of the already existing industries to produce the goods they need in the process of manufacturing, or by establishing subsidiary industries to supply the required articles. Weber believed that "agglomeration" would lead to savings due to the proximity of auxiliary industries, better marketing outlets, a wide range of financial and commercial services, etc. The result is higher production and reduction of costs; but when saturation point is reached congestion will creep in. As a result of overcrowding and pollution, the site will be less attractive to industries as a result of increase in rent and other costs. At this stage Weber recognized the deglomeration might be advantageous.

We find in Weber's analysis a rather close tie-up between the labour and agglomerating factors. He argued that industries with high value added can reduce expenses by agglomerating. To him, this value added has two main constituents, first, the labour cost expressed in wages and salaries and, second, the costs of manufacturing (which include interest and amortisation of fixed capital and cost of power). As the second constituent is dependent upon greater use of fuel (and this is not considered to be an important location factor) real agglomeration forces exist when the first constituent is the major part of the value added.

It follows that Weber divided industries into two main categories;

(a) those oriented to transportation and (b) those oriented towards labour. A less prominent type of orientation exists, which comprise industries locating because of agglomerating advantages - only when transportation and labour differentials at alternative sites are relatively small.

It is worth noting that Weber excluded institutional factors (interest, insurance, taxes, etc) from his analysis and accepted only those factors which were independent of specific economic systems. Other factors excluded from his general theory are climate and management on the grounds that they affected too few industrial locations to be of importance.

Criticisms of Weber are many and varied. Although his work formed the basis for his formulation of industrial location theory, it is criticised because it over-estimated the role of some of the location factors, while it ignored some of the important ones. His assumption of a given demand at a particular buying poing which remains unaffected by the locational selection of the seller was clearly unrealistic because market demand is a variable significantly affected by, and affecting, the locational interdependence of firms. His omission of institutional factors left a gap to be closed before a complete understanding of industrial location in a capitalistic economy.(16)

In considering the raw material sources and markets as fixed points, Weber ignored the spatial factors that affect the supply of raw material, especially for industries using agricultural raw materials. As a result of this, he reduced the importance of real

differences in raw material costs. He did not consider the fact that the cost of transporting finished goods might be different from transporting raw materials. He also under-estimated the role of pure raw materials and over-estimated the role of gross materials. Moreover, Weber's geographical determinism led him astray. He took it as axiomatic that iron and steel production must be concentrated close to large coal deposits because of the overwhelming influence of transport costs. However the tremendous reduction in transport costs that we have seen in the 20th century has meant that the iron and steel industry is now much more 'footloose' than Weber could have imagined. The entire phenomenon of Japanese heavy industry, for example, is inexplicable in his terms, since it is based entirely on raw materials imported over relatively long distances.

Dennison[17] criticised Weber on two major grounds. First; there was no logical difference between the factors he selected as important and those he rejected. His theory did not give adequate explanations of locational factors. Secondly, the assumption of fixed labour locations is unacceptable. It may generally be true that a firm can decide on a situation on the basis of a given distribution of labour; but it is obvious that location is the cause of the distribution of labour as well as an effect, and changes in location will lead to changes in the distribution of labour.

In short, one can say that Weber did not sufficiently consider the human and social factors and their importance in the location of industries. The "agglomeration" factors which he mentioned are a result of industrial linkage between the different manufacturing sectors. It results from the social nature of production and

cannot be discovered by analysing an isolated process of production. So, when social factors cause "agglomeration", there is no way of determining what production costs will be.

Finally, Weber's developed his ideas in relation, to continental Europe, especially Germany, and the North European countries. His ideas are hard to reconcile with UK geography.

Despite the above criticisms, Weber's influence was universal. Different schools of writers arose to explain manufacturing location as dependent upon the struggle to locate at places at least costs. The majority of these writers disregarded demand in the Von Thünen-Weber type of theory. For example, Predöhl attempted to investigate how far the location problem is a price problem and the location theory is a price-theory. To Predöhl general location theory is deducible from the application of the principle of substitution to the employment of the several groups of productive factors; ie, development of a substitution cost analysis. Although he visualized new horizons in the use of this principle, he remained within the scope of the traditional thought.(18) Ritschl(19) inquired historically into the changing pattern of cost and location. Other students of Weber attempted to measure the displacement of certain plants from the least cost transportation point, and these were explained as a result of labour and agglomerative forces.(20) Holmes and other writers discussed industrial location in terms of orientation to raw materials, labour and other factors.(21)

Other writers expressed interest in the size of the market, and therefore, were concerned with demand factor. Plandor(22)

elaborated Weber's model by making explicit its market area component. In his formulation lies the core of the cricitisms of Weber's least cost theory. He insisted on the importance of depicting the economic development process, and consequently his analysis was confined to the adaptations of enterprise during a time period, the movement of factors during the same period, and the concomitant changes of techniques, institutions and consumer base.(23)

Along the same lines of the least cost location for manufacturing industry, Hoover(24) also shows interest in the demand factor. His work is deserving of detailed consideration, as his theory does not fit perfectly into the Von Thünen-Weber model. Reference is made to the size of the market area for a particular firm's product. His main contribution lies in penetrating discussions of the influence of live sets of costs. First:- costs of processing raw materials, including agglomerative forces and institutional cost factors. Secondly:- the transportation costs, ie, costs of distributing the finished product.

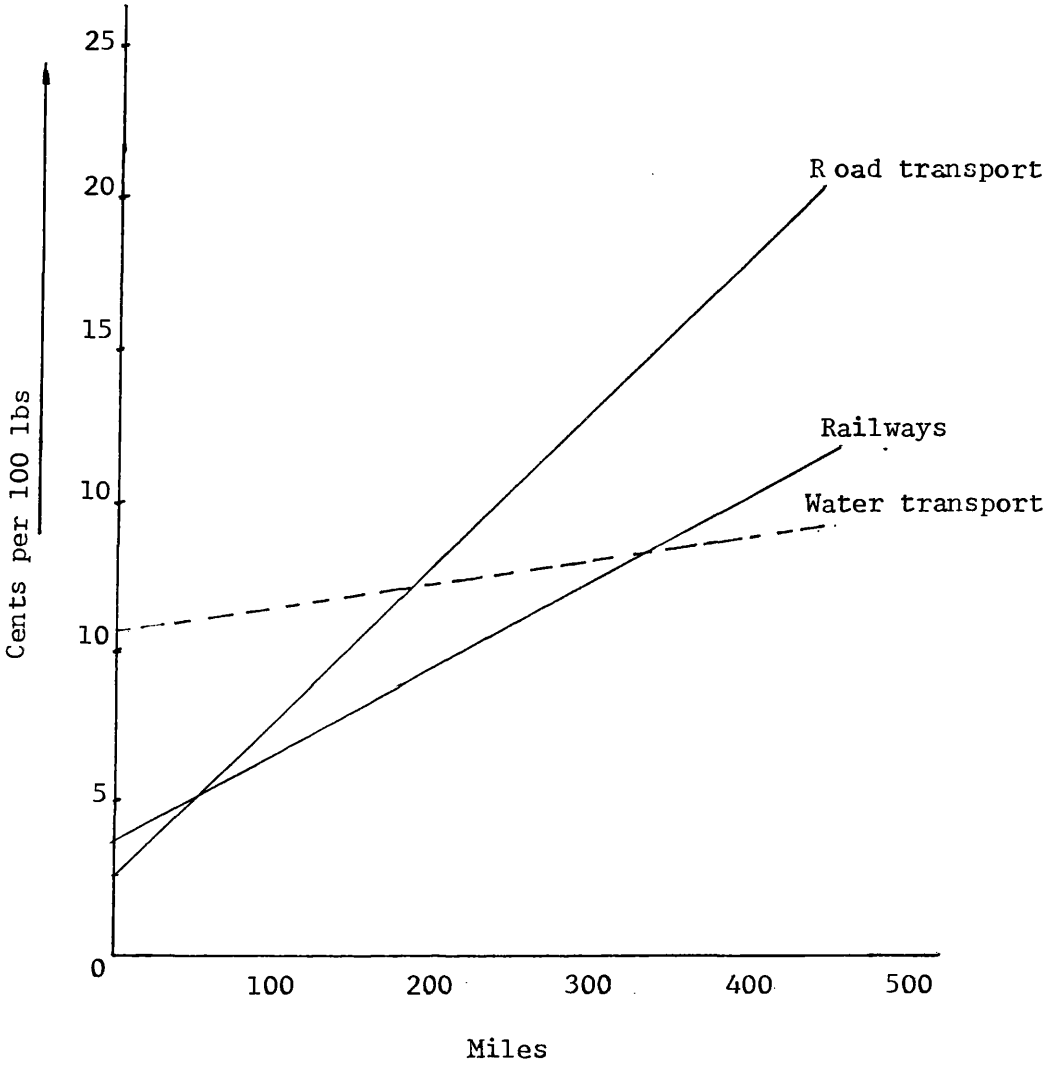
Hoover places greater influence on the structure and characteristics of freight charges than in Weber's analysis, who failed to recognize the full significance of terminal handling charges, long haul economics and the physical lay out of transport routes. Hoover explicitly assumes that the cost of transfer does not increase proportionately with distance, and hence this tends to decrease the importance of the transport factor as distance increases. Such transport rates usually have the effect of encouraging long hauls shipments which leads to a reduction of possible production points.

Terminal expenses are fixed costs, irrespective of the length of the haul, and the higher the terminal costs of a transport agency, the greater is the economy of long hauls. Water transport usually is the cheapest way of moving bulky products over long distances to scattered markets, railways are more economical over short distances and road transport is used for very short hauls. Figure (2.4) shows the highway, rail and waterway cost progressions according to distance. The influence of transfer costs tends to locate production at markets, materials or at junctions. In short one can say that "early stages of production are material oriented and late stages are market oriented while intermediate stages are relatively 'foot loose' as to transfer considerations".(25)

Hoover's analysis of agglomerating and deglomerating forces is more penetrating than that of Weber's, with emphasis placed on advantages due to better transfer services, more flexible labour market, advanced banking facilities, lower insurance costs and utility rates. In addition, with urban concentration specialization of functions as between firms can be carried further. Thus, certain operations and services that a firm in a smaller place would have to do for itself can now be framed out cheaply.(26)

In his analysis of agglomeration, Weber did not distinguish between large scale economies within a firm, localization economies and urban concentration for all firms in all industries at a particular location. Hoover analysed these forces separately and hence made an important contribution to a fuller understanding of the concept of agglomeration.

Figure 2.4 (27)



Mileage-cost scales development for movements of commodities in the lower Mississippi area 1939-40.

Being interested in all possible locating forces, Hoover included institutional factors in his analysis. Property tax is regarded as an element of land cost which reflects the return on the investment, thereby influencing the locational choice. He states:

> "A tax that becomes a fixed cost regardless the rate of output ..... penalizes localities where plant and equipment are less fully utilized and sharpens the producer's incentive to find a location where less capital investment is required per unit of output."(28)

The locational influence of climate is also considered a form of high land cost, as hot climate is likely to curtail output, and thus raises unit labour costs as a result of installation of air conditioning.

Although supply and market areas(29) are central to Hoover's analysis, and hence, introducing the concept of spatial interdependence, his major weakness is his failure to probe deeply into locational interdependence. He does not explain the 'whys' of the location from the standpoint of locational interdependence (demand). His analysis abstracts from demand despite his suggestive references to such a factor location. A more broad look which seeks to find reasons for a particular location and highlights the factors causing industrial concentration and dispersion, is required; and this is provided by the locational interdependence framework.

2.3 Locational Interdependence

Harold Hotelling was one of the first market theorists to upset traditional economic thinking when he argued that, an increase in price by one seller, while his rivals keep theirs fixed, would diminish his sales continually, rather than in the abrupt way which had tacitly been assumed.(30) He considered the characteristics of spatially distributed interdependent markets. His argument is based on the following assumptions:-

(1) There are two competitors and both aim to maximize their profits (a duopoly).

(2) Equal costs for obtaining and processing raw materials at all locations.

(3) Transport costs incurred in making a purchase are borne by the buyer, ie, sales of goods on a f-o-b basis.

(4) The product offered for sale is of uniform quality.

(5) Total demand is infinitely inelastic.

(6) Even spatial scattering of consumers.

(7) Perfect mobility in relation to location.

Given the above assumptions, the equilibrium location for the two sellers is at the mid-point of the entire market area. Each seller will attempt to capture as much of the total market as possible, until both come together in the centre of the market to earn exactly

one-half of the available profits each.

It has to be assumed that Hotelling's argument related to market-oriented manufacturing, for in such a context it could be used to explain increasing agglomeration in plant location patterns. Unfortunately, his principles are not generally valid as certain parts of Hotelling's model do not, however, correspond to reality. The major problem with his formulation is the assumption of inelastic demand. By dropping this assumption Smithies[31] postulated three possible sets of strategies to follow in determining their equilibrium location. If one firm initiates a change then the other can choose one of these three courses of action: (a) a symmetrical price and location response; (b) a symmetrical price change only and (c) no change in either price or location.

If the assumption of two sellers is also relaxed, then the equilibrium position as postulated by Hotelling will change. (Hotelling offered the view that the sellers would localize at the centre of the market.) With three sellers Chamberlin [32] argues that the two will locate at the quartile points with the third somewhere between them, while with a greater number of sellers they may group in two's, but any group of three or more will be broken up.

According to Lerner and Singer, who provide an extensive and careful assessment of Hotelling's argument, the dispersal influences which exist are formed by the need of each firm not to be caught between the other two.[33] Their main argument rests upon their relaxation of the assumption of infinitely inelastic demand curve. Once this

assumption is relaxed, it becomes apparent that the firms will disperse in a more ideal way. They realistically set an upper limit which they call the demand price; (that is, limit of stretch if demand is completely inelastic), and they have suggested analytical methods for the case where a demand with some elasticity is postulated for such consumers. For example, in a duopolistic situation, having assumed that A keeps to the extreme left of his indifference range, B to the extreme right of his, they show that optimum location is at a quartile position and not at the centre. Consequently, their conclusions differ significantly from those of Hotelling. The arguments of the different writers mentioned above are highly abstract: by making different assumptions, each arrives at radically different conclusions. This in turn suggests that this body of location theory is only a partial theory, and one that is difficult to apply to the real world. The theory is dynamic in the sense that competitors may move their locations until an equilibrium is reached; but it is not developmental, once an equilibrium is reached, no further changes are anticipated. Moreover, another limitation of locational interdependence is abstraction from cost in a similar manner to the abstraction from demand of the least-cost theorists.

2.4 Market Area Analysis

We have already shown that the locational interdependence approach attempts to determine the reasons for a particular location, assumes freely moveable locations and stresses the attraction or repulsion of a location to a firm by the presence of a rival at a specific location. Although this approach is related in some aspects

to the market area analysis (both schools of thought emphasize the monopolistic aspects of space) the two are analytically quite distinct. The latter attempts to form a definite idea of the extent and shape of the market area of the firm in order to determine the spatial feature of its market.(34)

Assuming that (a) buyers are evenly scattered and have identical demand schedules; (b) the firms are monopolistically competitive because they are geographically dispersed; (c) rivals charge identifical net-mill prices which are marked up above their costs by the same sums; (d) product is sold on a f-o-b basis and (e) the freight rates on the final product are the same for all sellers, then a straight line (assuming two sellers) separates the markets of the two producers. With relaxation of the assumption regarding selling on a non-dscriminatory f-o-b mill basis, the straight line becomes a curve. The relation of prices in the two markets determines the location of the boundary line: the lower the relative price, the larger the tributary area.

August Lösch's study of economics of location is based on a market solution, rather than a least transport cost solution.(35) His main interests are in economic regions and trade, and his chief contribution is the formulation of a market area approach to activity location, which is far more sophisticated than that of Hotelling's framework. His general theory of location is based on competition for available markets.

Lösch assumed (a) uniform distribution of industrial raw materials; (b) ubiquitous transportation possibilities; (c) equal costs at all

points over a homogenous plain; (d) an even distribution of population; (e) identical consumer tastes and preferences; (f) technical knowledge and production opportunities being disseminated throughout the plain and available to all; (g) firms faced with locational decisions are so geographically spread apart that their markets and the demand available to them are not affected by the locations of rival firms.

Given the above assumptions, equilibrium is the net resultant of two tendencies: Firstly, producers aim at maximizing individual profits and consumers try to gain access to the cheapest market. Secondly, a competitive struggle between producers when firms in an industry multiply sufficiently to compete spatially, eventually wipes out excess profit. When all supernormal profits have disappeared, equilibrium is attained; the struggle for space dies down and locations are determined. To Lösch this is the ideal economic form of market areas for two reasons, (a) because a net of hexagonal market forms will completely cover any area under consideration, and (b) of all the regular polygons which will cover a given area completely, the hexagon deviates least from the circular form and thus minimizes the transport expenditures in supplying a given demand.

It is felt that Lösch's framework has direct relevance to manufacturing industry in two respects, (1) market-oriented manufacturing has an obvious relationship with central-place theory[36]; (2) the case of footloose industries, in which category, Friedmann suggests, the majority of industries in the United States belong.[37]

A footloose industry is defined as one whose procurement and distribution costs do not vary significantly with location. However, many footloose industries are attracted to urban centres where agglomeration or labour supply advantages may be exploited. In so far as the magnitude of these external economies is related to the size of an urban centre, then Lösch's theory is of relevance in this circumstance. Other types of manufacturing would not appear to fit very satisfactorily into a market area arrangement, namely because of the influence of locational factors on the supply side: this would appear to coincide with Winsborough's finding that:

> " ..... correlations for urbanization indexes between regions are generally larger for service industries than for manufacturing industries. This later finding suggests that the model of the urban hierarchy works most satisfactorily for service industries. For manufacturing industries, the assumption of equal distribution of resources may hamper the use of the model as a device for predicting the urbanization of industries."(38)

Although Lösch's general theory is not free from limitations, its pathbreaking nature should be recognized. It was the first attempt to describe general spatial relations in a set of simple equations, and by presenting a model of the space economy operating under conditions of monopolistic competition, Lösch avoided the difficulties arising from the assumption of perfect competition. The model can be criticised for not being general enough, nor adequate to explain plant location in a capitalist economy due to its failure (a) to include cost differentials, other than those

attributable to agglomerating and transportation advantages; and (b) his consequent failure to combine an analysis of cost and demand factors in one model. His theory also assumes independence of production, so that the spatial economy is made up of several independent sectors rather than being a united whole. Producers are thus treated as spatial monopolists who can disregard the activities of others except where some unused space exists which can be competed for. This may be valid if the firm is locating in a non-industrialized region, it seems too restrictive when a highly developed industrial area is being considered.

Despite its deficiencies, his argument is worth re-examination. In particular, the greater the transport costs of the final product, the more production will be dispersed over the space, whilst the greater the economics of agglomeration, the more it will be concentrated.

Greenhut bases his model of spatial location partly on Lösch's model of market area analysis and partly on locational interdpendence of Hotelling.(39) Here the costs are allowed to vary and demand influences are affected by the possibility of locational inter-dependence. It is worth noting that allowing costs to vary from site to site, show the important differences in his theory, besides the analysis is carried out within an opligopolistic framework in contrast to Lösch's monopolistic one. However, there are certain similarities to that of Lösch, in that individual firms aim to maximize profits and equilibrium requires the elimination of excess profits via the tangency of the average revenue to the average cost curve. Indeed, his main contribution to location theory is his attempt to fuse the ideas of Weber and Lösch. Weber did not

consider adequately the need to maximize effective demand, and the notion of market area is not developed at all by him. Lösch, on the other hand, while accepting the agglomeration forces as being important to plant location, did not attribute sufficient importance to locational interdependence, with the result that plants are more dispersed than in reality. Greenhut emphasizes the need for a broader statement of the determinants of plant location; than the one that simply concludes that firms seek the location with the least-cost, or one which states that firms seek the location with the largest possible market area.

Greenhut argues that each new entrant to a market area will seek a location from which maximum profit can be gained at the lowest total cost, ie, that site from which a given number of buyers can be served at the lowest total cost. Equilibrium will be seen to occur when marginal revenue equals marginal costs; and that firms are clustered together or dispersed around the market area in such a way that relocation by even one firm would involve losses. At that point, equilibrium can be disturbed either by changes in demand or changes in cost.

The main weakness of Greenhut's model is that the impact of transport cost was not integrated into his general equilibrium framework, a defect which was also common to Lösch. This means that Greenhut's model is unable to handle the existence of differentiated market areas, nodal points in space economy, or spacialized transport channels within a market area. Transport being a relevant factor in location is supported by Isard[40]; yet many industries pay scant regard to transport costs in locational decisions, at any rate in

Europe.[41]

Walter Isard's contribution represents what is, to date, the most successful attempt at synthesizing location theories in order to depict and understand past, current and future spatial distribution of economic activity, population and related magnitudes. Following Ohlin[42], he argues that agglomeration does affect significantly, the location of economic activity and hence the movement of goods between locations whether these locations are within several regions of a nation, or within the nations of a world region composed of many nations, or within the world itself.

When creative minds and tangible resources have been brought together they start to interact. A stage is set for action in case cultural and structural circumstances so permit. The result is a socio-environmental process which can hardly be predicted or planned but can perhaps, to a certain degree, be influenced by strategic policies; and requires a very flexible environment for digesting the results in non-harmful ways.

Isard's discussion of urbanization economics is phrased in suggestive rather than indicative terms. He suggests that cost curves for services (education, transportation, health ..... etc) may be combined, to form a curve which describes the total urbanization economies that accrue to a city of a given size. The main problem in defining such a total curve is the interrelationships that exist between its various constituents. However, conceptually, the notion of a total scale economy curve for urban centres would seem to be reasonable, if difficult to define in practice.

Extending the work of Beckmann-Marschak[43] and Koopmans and Beckman[44] in developing a method to counter the restrictiveness of equilibrium models, Isard details a linear programming model that generates alternative locations for (n) firms. The objective function is to find an optimal location for each firm within the constraints of resource availability, maximization of income, and the full expression of the possible activity variants available to each firm.

Another programming model is that of Lefeber.[45] His model includes an explicit recognition of the importance of transport costs to a manufacturer by postulating a distinction between transportable and non-transportable factors of production. He criticised both Lösch and Isard for assuming a continuous transport plane with uniform transport rates. The objective of his analysis is to show simultaneously the optimal locational pattern and how this pattern maximizes the production of final goods for consumers. The 'dual' of this objective is to minimize the deduction from final output required for transportation services. The conditions of spatial equilibrium are as follows. (1) The value of the marginal product of a factor originating from a given location must equal its rent in local employment. (2) Factors employed in transportation must receive the same rent as in local employment. (3) If a factor is idle at one location its locally received rent must be zero, while if it is employed at the other location its rent there must equal the marginal cost of its transportation. Lefeber generalizes his model by considering consumption location as well as production locations.

Market prices, technology, the availability of factors of production, and the costs of transport determine optimal locations for each firm in Lefeber's model. Such a location and maximization of the value of output, are obtained under the unreal assumptions of pure competition, perfect knowledge, and no institutional rigidities. Relaxation of these assumptions, however, results in departure from the optimum, and leads to uncertainty in the performance of the model. Lack of knowledge, industrial inertia, and institutional rigidities may interfere with the calculation of an optimum location for the firm.

An important contribution to the strands of thought on industrial location is the work of Francois Perroux.(46) His concept of "Poles of Growth" is based on the development of an industrial complex of interrelated firms. This signifies a location where major concentrated development has occurred or can be sparked because of the location's resource base, import substitution possibilities, externalities, exploitation of amenities, and a host of other factors. Such concentration involves developing a great variety of skills in the labour force, managerial risk-taking abilities and sharing of specialist services. In many developing countries (Latin America, India) location policies are primarily directed towards the economic development of vast tracts of under-populated or backward territories and the exploitation of their natural resources. Spain's policy of regional development, as stated in their First Economic and Social Development Plan, was to create poles of industrial advancement in selected provinces, and to intensify and direct desirable agricultural change.

Similarly in France, a great deal of attention has been paid in the past to the creation of industrial zones, primarily aimed at preventing the depopulation of the rural areas and over-concentration in the older industrial centres around Paris and the North.

The pole provides the physical infrastructure. Sometimes as in the United Kingdom, complete factory buildings are offered at reasonable rents to potential industrialists; elsewhere a firm may be given special financial concessions and technical assistance for building its own premises. Industry is generally of the light or medium type, characterized by mobility and flexibility, and its output is usually of fairly high quality and low bulk.

The notion of development serves as propulsive force not only at the growth pole but also at several other regions as the rowth pole provides an ideal tool for integrated development. This "spread effect", as coined by Myrdal(47), is closely associated with the fact that industrial growth in other localities and regions can be oriented to the newer markets emerging at the growth pole - from increasing demands by industry for input requirements. In short, as a growth pole develops, it can pull the whole or a large part of the region along with it. However, it can also have "back wash effects" in other localities.

> "The localities and regions where economic activity is expanding will attract net immigration from other parts of the country. As migration is always selective, at least with respect to the migrant's age, this movement by itself tends to favour the rapidly growing communities and disfavour others."(48)

The role of industrial linkage in inducing industries to locate in certain localities has been the subject of a number of studies. Recent interest in this topic owes much to Sargant Florence.[49] Linkage may be classified as "backward" via input requirements leading to additional industrial growth or "forward" due to industrial interconnections. A further useful distinction made by Professor Florence and the West Midland Group[50] is between "Vertical" (where flows involve successive operations on initial materials by different factories), "Lateral" (flows of different components from several plants to one factory for assembly), and "Diagonal" linkage (products of a particular factory, are used by plants in different industries).

Florence[51], the West Midland Group[52] and Wise and Beesley[53] have shown beyond the shadow of any doubt the role of linkage in the growth of the metal-fabricating, jewellery, gun and car assemply industries of Birmingham and the West Midlands; Townsend[54] emphasized the interdependence of the cutlery and lighter engineering trades of Sheffield; and Smith[55], Florence[56] and Rogers[57] have drawn attention to the complex interrelationship and external economies which for so long contributed to the success of the Lancashire cotton textile industry.

In his study of the British and American industries, Florence[58] shows that, for some industries, there are relatively high localization coefficients, for others there are location patterns described as "swarming", "foot loose" and "linked". This classification is important to the planner who is seeking to persuade industry to move

to a particular location.

2.5 Behavioural Models of Location Theory

By and large, industrial location theory has developed in two contrasting directions. One has been concerned with refining the classical normative framework. This is the approach used in Weber's theory of Plant Location, given certain raw material supplies, transfer costs, labour and agglomeration economies, and a market, he specifies a unique optimum location. It has also been used by Locational interdependence/Market Area theorists.

The second alternative approach, and currently of considerable interest to social scientists, is the behavioural approach to industrial location theory; which recognizes the need to allow for imperfections in the human element in an economic system. Models of the behavioural type focus on growth and behaviour of the firm, not as optimizing rationally-economic decision-making unit, but as one characterized by conflicting goals and limited levels of knowledge and control of its environment. Simon, in his "Theory of Bounded Rationality" rejects the concept of economic man, replacing it with a concept of man whose intelligence and ability is limited, and therefore whose capacity to select an optimal solution to a given problem is also limited.(59) Accepting this fact Simon proposed a theory of adaptive behaviour incorporating the concept of a satisfactory return to the effort expended in making and implementing a decision. In other words the decision maker aims for a limited return from each phase of his proposed course of action and, not therefore trying to get optimum results from each decision, is able to modify these as circumstances

warrant. The implications of Simon's satisficing model in behavioural location terms are that the firm will avoid risky locations and those which involve high congestion costs even if a cost calculation could be made to show that the advantages of a particular site offset the risk and costs involved. The emphasis here is on "safe" locations in already industrialized areas rather than on the extension of industrial production into less industrialized areas. The approach accepts as a fundamental starting point "the domination of the location issue by the industrial organization, firm or corporation: its goals, growth, size, age production profile, organization and behaviour."[60]

Pred[61] has three specific objections to the concept of economic man. First, there is the problem of logical-consistency of the assumptions involved. The optimizing goal is ambiguous; ie, "What action is optimal for one firm depends on the actions of the other firms." This condition requires every decision making-unit to "outguess one's opponents, but not to be outguessed by them."[62] Disclosure of this decision may cause other firms to alter their strategies, with the result that the strategy for the original firm is no longer optimal. On the other hand, other firms must have this information if they are to make optimum decisions. Therefore, an individual's optimum is not consistent with group's optimum. Second, there is the problem of the motives ascribed to economic man. The profit maximization motives have been subject to attack because of their subjective nature and incompatibility with empirical findings. Katona[63] argued that interest in business volume often transcends interest in business profits. Another objection centres on the fact that where ownership and management are

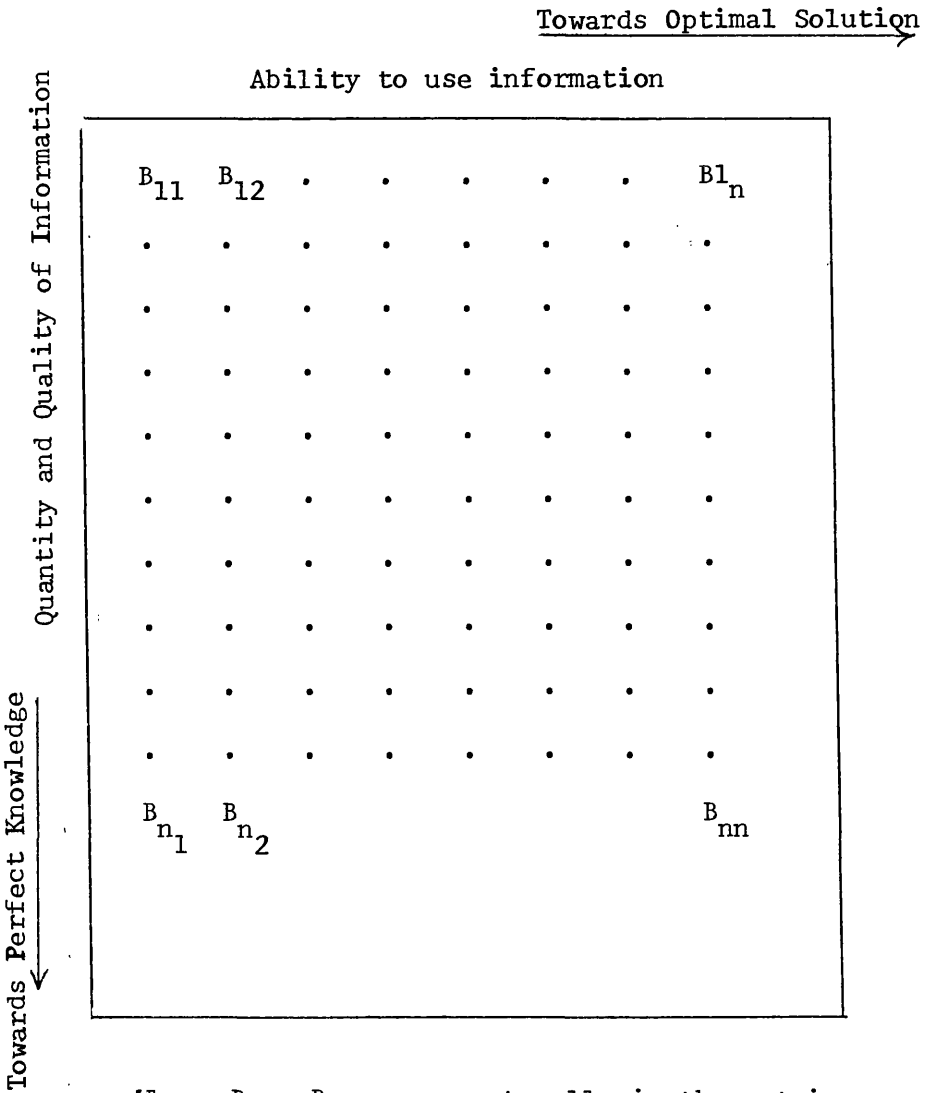
separate, decisions may not be predicted on maximizing profit. More importantly, it is often argued that "the firm may not care to maximize, but may simply want to earn a return that the entrepreneur regards as satisfactory."(64)

Thirdly, the perfect knowledge of man has been dismissed because of its unwarranted departure from reality, and in particular because information is something that must be obtained, rather than something that is given.(65) This last point Pred develops in some depth by casting industrial location decisions into a behavioural framework through his behavioural matrix. (See figure 2.5). He states:

> "As a point of departure then, every locational decision is viewed as occurring under conditions of varying information ability, ranging, at least theoretically, from null to perfect knowledge of all alternatives, and as being governed by the varying abilities (as well as objectives) of the decision maker(s). In the behavioural matrix the information variable is depicted on the vertical axis, and the ability-to-use variable, which theoretically ranges from total ineptitude to an aptitude for optimal solution, is represented on the horizontal axis."(67)

Pred considers that the deviations recorded by his matrix are explicable if the possibility of limits on information and information usage can be accepted. Because, however, the matrix cannot predict how good the resulting choice will be, Pred admits that the bounded rationality of Simon's satisficing model is more likely to be a behavioural norm than is a profit maximizing position.

Figure 2.5 Pred's Behavioural Locational Matrix



Where B_{11} B_{nn} represent cells in the matrix corresponding to different combinations of attributes on the two dimensions.

An important conclusion emerges from the above analysis: the behavioural school yields valuable insights into real-world manufacturing location patterns. This is mainly due, in Smith's view[68] to the fact that "classical theorists have been more concerned with the construction of elegant theories of location theory and production theory, than with providing a guide for empirical enquiry." Another important point is the basic pre-occupation of the classical theory with "static" pattern rather than changes over time, and its stress upon the impact of transport costs on materials and products on manufacturing location. Moreover the classical theory, being concerned with long-run optimization of locational economic benefits, ignores variations due to the environment, information availability, and different goals and forms of company organization.[69] A recent study about manufacturing migration within developed countries concluded that - "as far as the movement of firms is concerned, traditional theories need to be replaced by a behavioural theory of movement."[70]

Despite the above, the behavioural approach has been criticised on three major grounds.[71] First: It is more data demanding than the classical theory. Secondly: Difficulty of identifying the behavioural regularities which might form the basis of a general location theory. Thirdly: No well defined single behavioural location theory has yet emerged. Even Pred's attempt is, in his own words, "only a verbal formalization of the fairly obvious."[72]

2.6 Empirical Studies

The following section attempts to provide an overall picture of the experience of developed countries in the application of various criteria for industrial location. Being aware of the institutional differences of these countries, emphasis will be placed on the growing importance of the macro-economic criteria and on the basic change affecting the mechanism of the decision-making process of industrial location. It is also intended to provide an indication of the importance of the influences so far only theoretically covered.

One group of empirical studies concern themselves with the purely spatial component of locational decisions. The studies of Ellis[73] and Katona-Morgan are points in case.[74] The results of these studies are given in Tables 2.1 and 2.2. The most striking element common to both studies is the role of personal factors on locational decision-making. Four points emerge in evaluating such "non-economic" factors. First, the spatial variable which is inherent in the location decision has different regional implications. Not only must an "area" and a "site" be selected, but also various sub-regions and localities. Personal preferences may exert influence on the choice of the different regional levels to different extents. Secondly, this does imply that firms are not acting in a manner consistent with profit maximization. Firms which behave in a competitive manner would be expected to respond to such forces as proximity to markets, nearness to materials, and so forth. The studies of Ellis and Katona-Morgan suggest that this may not be the case, the personal factor - on the surface - appears too strong. Thirdly, variables, such as tradition, education, values, and economic environment may be

Table 2.1[75]

Why did new manufacturing establishments locate in New England?

Principle Reason for Locating in New England	All firms	New firms	Branch Plants	Plant Re-location
Personal Reasons	37	29	2	6
Market Advantages	28	7	11	10
Production Relationships	19	1	18	-
Material Availability	11	2	6	3
Management Relationships	8	1	6	1
Labour Considerations	6	2	2	2
Other Considerations	9	-	8	1
	118	42	53	23

significant determinants of personal preferences. Fourthly, this point relates to the correlation between the personal element and firm size. The Ellis study (Table 2.1) indicates that the personal element played the biggest role in new firms. New firms, however, are the smaller firms.[76] The Katona-Morgan survey (Table 2.2) indicates that the personal element played a stronger role in the case of smaller firms. This is not unexpected. Ford Motor Company, for example, would not be expected to "personally care" in what community a branch plant is to be located. Their

Table 2.2[77]

Reasons for locating in Michegan

	Percentages of Employees Represented Number of Workers in Plant		
	100 or more	Less than 100	All Plants
Personal Reasons	46	75	51
To be near markets	39	10	33
Enabling factors	12	10	12
To be near materials	10	2	8
Available manpower or skills	5	9	6
Assistance or encouragement by local groups	2	1	2
Other miscellaneous reasons			

*Totals add up to more than 100 per cent because many respondents gave more than one response.

choice of Bridgend to locate their £180 million plant is strong evidence of the above argument. The site was chosen because of the financial assistance given by the British government and Ford's only European foundry and its main engine plant is already in the UK, at Dagenham. Other considerations were, size of UK market, communications, availability of skilled labour, and large space for construction.

Other non-economic considerations influencing plant location in real life are (1) psychological factors, (2) amenity and social factors. Regarding the first set, psychologists stress that behavioural patterns are based on perceived opportunities. There is no guarantee that the perceived image of a given place need conform to reality, although several studies of spatial perception show a reasonable correspondence between mental maps and actual conditions.(78) Notwithstanding, there are strong reasons for believing that people frequently develop perceived images of places which are either more favourable, or less favourable than reality, and which are strongly influenced by circumstantial factors. Friedmann has stated that private investors consistently overestimate the profitability of enterprise at the Centre, while underestimating it at the periphery.(79)

Ullman has explored the role of amenity resources in contemporary development of the United States.(80) The vast migration of people to California since the 1930's can be explained largely in terms of the excellent climate enjoyed by that State. The movement of Canadians to Vancouver and the French to Nice are analogous examples. The development of areas enjoying a favourable climate is not simply a product of labour migration, but also of the increasingly large and mobile retired community and the longer vacation periods taken by people employed elsewhere. Ullman also mentions the increase in the proportion of people employed in tertiary, as opposed to primary and secondary industries; those tertiary industries which are foot loose at a national scale are able to take advantage of amenity attractions.

Lack of space, was pointed out by Loasby[81] and Smith[82] as the major critical problem facing firms considering locational alternatives to their present sites. This was supported by Dunning[83], Cameron and Clark[84], Keeble[85] and the Board of Trade[86]. Cameron and Clark in their study of 'The Industrial Movement and Regional Problem, Glasgow' show that the decision-making tended to be based on an evaluation of a relatively simple range of issues, and that seven major factors are of special importance. (Table 2.3). The most interesting feature of the decisions was the overwhelming importance of the supply of trainable labour. 80 per cent of the companies indicated that this influenced their decision. Second in importance is the co-operation of the local authority. Almost 60 per cent of the companies mentioned this factor as influencing their selection of a particular site.

The leading role of labour in the field of industrial locations is found too by Luttrel[87] who presents the results depicted in Table 2.4 of an enquiry into 93 British firms. Townroe[88] shows that for many firms the requirements for labour at an alternative location is not only a function of the quality of the labour they require, but also depends on the proportion of their existing labour force that they can persuade to move with the firm. In this way the labour factor may act as a spatial filter by circumscribing the distance over which the firm can search for alternative sites. Law[89] found labour to be the important factor for "over 50 per cent of his firms' moves to Northern Ireland." He claims "..... labour relations particularly after the "settling in" period, were good, and turnover was usually low. For most of the selected plants, therefore,

Table 2.3 (90)

Factors Influencing the Final Area/Site Choice

	Major Category	% of all companies MENTIONING INDIVIDUAL FACTOR	Ranked by Frequency
A	Labour		
	Supply of trainable labour	80	1
	Good labour/management relationships	18	10
B	Accessibility		
	Accessibility to main inlets	44	3
	Accessibility to main suppliers	33	6
C	Factory/Site		
	Ready-built factory	38	4
	Low factory rents	24	7
	Fully-serviced site	31	7
D	Local Services		
	Transport facilities for goods	37	5
	Transport facilities for personnel	14	14
E	Environment		
	Attractiveness of local environment	27	8
F	Agency Co-Operation		
	Local authority co-operation	58	2
G	Others		
	Portable Water	3	18
	Effluent Disposal	3	18

Table 2.4[91]

Main Impetus to finding a New Location after 1954 for 93 Firms in Great Britain

Industry Group	Labour	Premises*	Other	Total
Shoe	15	-	-	15
Hosiery	24	-	-	24
Clothing	5	-	-	5
Textiles	7	1	1	9
Engineering	5	2	-	7
Electrical Goods	8	1	-	9
Metal Goods	6	3	3	12
Miscellaneous	4	3	5	12
TOTAL	74	10	9	93

*Premises - meaning physical premises (the need for new factory space

labour costs have tended to offset locational disadvantages."[92]

An important feature in the field of industrial location in developed countries is the diminishing role of transport costs. Wallace[93] found that transport costs are only a very small part of total costs, averaging less than five per cent, and are very unlikely to promote a search for an alternative location in the absence of other push or pull factors. In 1962, a Soviet Economist, A Probst, wrote:

> "The technical and managerial progress in transportation diminishes transportation costs. This has a marked reflection in the field of indstrial location ..... where we find a tendency ..... the diminishing role of transportation and the relative growth of the importance of other factors."[94]

A Belgian economist, Leurguin, analysing the role of distance and transportation costs in industrial location presents another argument supporting the view of the diminishing role of transport costs:

> "At the time when Weber wrote, distance played a major part in determining the location of heavy industry. Technology was still relatively simple, which meant that there were not numerous complex variations of the ways in which factors could be combined; certain branches of industry, like steel making, require bulky raw materials which are used up in processes of production ..... . Today, the problem for many

industries is much more complex; the transport factor and the distance factor play a less important part and are more and more in competition with other cost factors. The cost of water, of labour, etc."[95]

It is interesting to note that A Weber, took into account only one element of natural environment, ie, mineral deposits; and to him water was considered unimportant. He argued "Water is a practically unlimited, and therefore an absolute ubiquity in many German regions."[96] Five decades later, the President's Material Policy Commission stated "By 1975 access to good water may become the most important factor in deciding where to locate industries."[97] So in the evaluation of water, we have a basic change: water is no longer a free commodity, it is a scarce commodity. In the field of location this change is reflected through the fact that water is no longer a ubiquitous material available practically everywhere, it is a localized material available in a limited number of places. In the United States about 50 per cent of total water use is represented by the demand of thermal electric power generation and manufacturing industry.

According to Borchert there are three characteristic features of industrial water use in the United States.[98]

(1) Industrial water use is concentrated with a few types of manufacturing industry.

(2) Industrial water use is concentrated in a relatively small number of big plants.

(3) Industrial water use is concentrated on a

relatively small territory (less than 1 per cent of the land area of the United States accounts for 52 per cent of the nation's manufacturing water use).

In such conditions industrial water use is not only a problem of industrial location, but also a problem of regional economic development.

In the evaluation of the role of natural environment in industrial location, not only the 'input', ie, water and climate, but also the 'output' aspect of the problem should be taken into account. In the classical micro-economic approach the input considerations were most important. The different elements of natural environment were evaluated from the point of view of the efficiency of production of the given plant. In recent years new trends have been observable in this field and the validity of the output side is receiving growing recognition. The problems of air and water pollution are solved not only by the urban and regional authorities, but also by the industry itself. Nevertheless, the problem of how to arrest and eliminate the processes of deterioration of natural environment caused by undesirable industrial outputs has not yet been solved in a satisfactory way in any country.

An important factor influencing locational decisions stems from the operation of governmental controls; and hence the emergence of the macro-economic criteria of industrial location. Such a criteria provides a challenge to the classical theory of industrial location and an example of this challenge could be provided from the Soviet

Union during the dramatic discussion on the location of new capacity of the iron and steel industry.(99)

Two solutions were reviewed:-

(a) Expansion of the existing iron and steel industry in the European part of the Soviet Union and specially in Donbass;

(b) The creation of a second base for the iron and steel industry in the Urals and Western Siberia - the Ural-Kuznetsk integrated plant.

The Theory of Weber was used as an important argument supporting the first solution and stressing the prohibitive transportation costs of the second. The followers of the idea of the second solution indicated correctly, that the theory of Weber cannot be used in this case. The approach of Weber was a typical micro-economic and short-run approach, taking for granted the existing distribution of population and economic activity. The decision to build the Ural-Kuznetsk was a typical macro-economic and long-run decision designed to change the existing distribution of population and economic activity. This experience may be said to merit special mention as being probably the first example of the successful application of a long-run and macro-economic approach to the criteria of industrial location.

In the USA, the well known Tennessee Valley Authority experience was started in the framework of New Deal Policies. The authority was established in 1933 in an area covering 92,000 square miles and serving a population of some 6.2 million. Its economy has grown at

a faster rate than that of the whole nation and has shifted from a predominantly agricultural area to an important and expanding industrial region. Between 1930 and 1960, the proportion of workers engaged in agriculture fell from 50 per cent to 13 per cent, whereas the proportion in manufacturing industry rose from 13 per cent to 26 per cent. Industrial expansion stimulated a big increase in 'tertiary' employment, such as services, commerce and finance.[100]

UK experience in this field goes back to 1934 when the first Special Areas Act was passed. This Act marked the acceptance by the government of some responsibility for influencing the pattern of industrial location. The objectives of this policy are described by Loasby[101] in the following way: "The whole history of location policy in this country has been conditioned by its origin in the realization that acute problems of localized unemployment lay half-concealed beneath the general depression of the inter-war years. It was, therefore, inevitable that location policy should be seen mainly as a means of alleviating such localized unemployment."

Scotland, Wales, Northern England and Northern Ireland were identified as 'special areas' of chronic unemployment. The Act appointed Commissioners and gave them the power to improve infrastructure and acquire land for industrial development. In 1936 State companies were established to provide factories in special areas. More legislation in 1937 held out direct financial aid to industry in the form of rates, rent and income tax relief, and loans. The Board of Trade was also given national control over new factory developments above a certain size, and this was extended in 1944, when the system of Industrial Development Certificates (IDCs) was set up as a means

of controlling the distribution of factory developments. Now companies wanting to expand their operations in one of the more prosperous areas of the country, had to apply for permission before they could go ahead. With the Board able to refuse them, the idea was that they would be driven out to invest in the needier areas.

Efforts by the then Board of Trade (now Department of Trade and Industry) were successful in promoting movement to depressed areas and new towns, indicating perhaps that such firms form something of a captive market for the attractive facet of governmental policy. Townroe[102] arguing in the opposite direction, suggested that this is not always the case and the push factor of IDC difficulties does not appear to lessen the effort put into searching for alternatives even though the attempt to attract the firm to a development area is almost invariably made. Batty found that of 44 firms that answered his questionnaire, 19 sought a new location because lack of space on their old site restricted expansion, while 13 did so because IDC difficulties had a similar affect and 10 for the financial incentives involved in development areas.[103] Smith[104] found that firms could jump over IDC control policy in relation to industrial mobility by buying existing premises, or by erecting extensions to their own plant. The Confederation of British Industry sees the IDC policy as resulting in net loss of national manufacturing output, including exports, for two reasons. Firstly, growth firms in prosperous regions, faced with the IDC expansion refusals, may have preferred to abandon expansion plans altogether or invest abroad rather than establish peripheral area plants. Secondly, assisted areas may prove in the long-run to be relatively uneconomic locations for modern industry, resulting in less efficient

and hence reduced production. However, the second argument is much more difficult to assess. The main arguments against peripheral regions centre on the transport cost, and labour quality and relations arguments. Loasby[105] found that half of all those Birmingham firms which had moved as far away as South Wales expressed dissatisfaction with their new location, and that "the biggest single cause of complaint seems to have been the inferiority of South Wales as a distributing centre, partly because of poor transport facilities." Such an argument provides considerable support for a centre-periphery model.

On the other hand, some surveys of immigrant firms in peripheral areas have argued that the transport costs are small relative to other costs. Woodward[106], Chisholm[107] and Edwards[108] showed that four per cent to five per cent of all manufacturing costs incurred by United Kingdom firms were transport costs. This indicates that differences in transport costs of alternative sites would generally have very little effect; and this works in favour of assisted areas.

Technology is of utmost importance to the organization structure of the firm and through this to its decision making process. Woodward shows the ability to change within the firm is dependent to a large extent on technological factors, both in the push sense of new technology requiring different types of premises and in the organizational sense of the possibility that technological factors might contradict formal rules of organization.

This leads us to locational implications of technological special-

ization which is a typical phenomenon in the metal processing industries. In the case of specialized plants 'external plants' are a very important factor affecting location. This is the world of interrelations between plants acting in the capacity of contractors and sub-contractors and in some cases in that of assembly-line industries which generate demand for thousands of specialized plants. The locational implications of this process can be described as the preference for locating specialized plants in the metropolitan areas which afford the best advantages with regard to external economies and which have varied labour resources. Such an approach was advocated for promotion of an industrial development pole in Southern Italy which was prepared by a team guided by E Tosco. The objective and method of this study is (1) to create in the provinces of Bari and Taranto an industrial centre that will be sufficiently closely knit to continue development once the initial nucleus has been established; (2) the method employed consists of establishing an intermediary industry - in this case heavy and medium mechanical engineering.(109)

2.7 Locational Factors

It is constructive to bring together in this section the theories of industrial location and the range of location factors depicted by the empirical studies summarised in the previous section.

The empirical work provides a strong evidence of the fact that a location theory concentrating only on least transport cost or market orientation is unrealistic. The past decades witnessed the emergence of the most important changes in the field of industrial location which can be described as follows:

(1) The diminishing role of transport costs and supply problems in the developed countries. The impact of the development of modern highway systems and advanced transportation networks on the location of economic activity is specially important in this field.

(2) The growing role of labour. The 1934 Special Areas Act has been passed to solve chronic unemployment problems in Scotland, Wales, Northern England and Northern Ireland. Indeed, the availability of labour was the main consideration for 60 per cent of the firms in 1957-1962 to build new plants in Ulster. Cameron and Clark (1966), Luttrel (1962) and Law (1964) all showed labour availability as an important factor influencing the final area and site choice. A very recent example is Ford's choice of Bridgend in Wales to locate their new £180 million plant. Chief among the factors that influenced the final decision are the area's good labour records and availability of skilled labour.

(3) Finally, the behavioural approach to industrial location is gaining momentum in the evaluation of particular locations once the broad factors have been determined. The location problem occurs so rarely for the majority of firms. There is a lack of precedent available. Managerial resources may be stretched up to, if not beyond, the point of

zero organizational slack.[110]

As Marris[111] argues, "The testing tasks of business life are these which are the least routine." Using Rapoport's[112] distinction, the managers may be faced with a dilemma rather than a problem. A situation which is not immediately solvable in the frame of reference suggested by its nature or past precedent. This dilemma may lead to high levels of uncertainty, and this is one of the reasons why the study of industrial location can highlight interesting aspects of managerial behaviour.

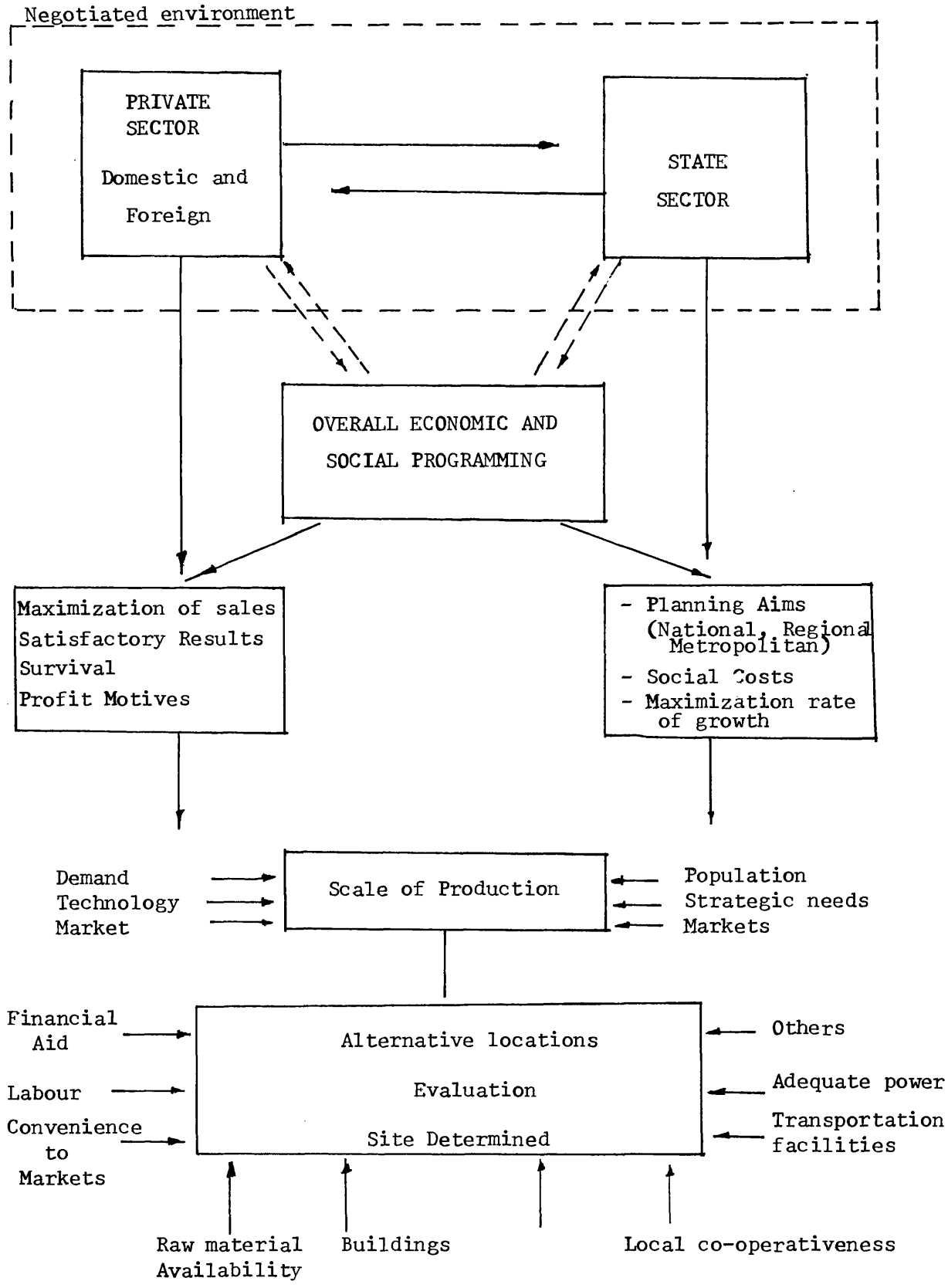
Figure 2.6 shows that private and public sectors exist in a negotiated environment. Thomas[113] suggests that the concept of 'negotiated environment' is based on three grounds, "first on the role of government in creating and regulating a framework within which individuals, enterprises and groups can interact, second, on the extent to which they then seek to regulate their immediate environments by collective action, and third, on the interaction of government with them in pursuing their goals and in seeking to further political and social aims."[114]

The figure distinguishes the motives involved at macro-level, basically overall economic and social development, and then details the influences of labour supply, convenience to market, availability of raw materials, buildings, local co-operativeness, adequate power, transportation facilities, financial aid, and others on the locational decision.

Ford's choice of Bridgend is a good example of the interaction that

Figure 2.6

Factors Influencing Location Decisions



takes place between the State and the firm. The company first approached the national governments of Europe to look over the likely prospects and financial inducements. The then British Prime Minister James Callaghan and Secretary for Industry, Eric Varley, were both involved in attracting the plant to Wales. The financial package which amounts to £70 million (40 per cent of the £180 million capital cost) is a reflection of how the British government worked hard to ensure that the plant came to the UK.

The recognition of the need for a new location by Ford is the result of their interactions with the wider environment. Their planners forecasted that by 1986 car sales in Europe would jump by 30 per cent. To capture a share of that, they must invest heavily without delay. Therefore, their motive towards a new location is to sustain their UK market and increase their car sales in Europe.

As shown in figure 2.6, the role of the State in influencing the location decisions can be felt at several levels. The overall social and economic programme may be translated into specific policies in the fields of regional programming, metropolitan programming and national strategic needs. Such policies may affect the firm's choice of its site.

CHAPTER THREE

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The opulence of information on the subject of methodology may have actually served to impede the starting researcher due to the confusing maze of terms, definitions and philosophical arguments given by different philosophers. To examine briefly some of the work of these writers, Kant[1] gave a brief definition: "Transcendental doctrine of Method" which is not illuminating for any one who has not studied Kant's work. According to Windelbard[2], methodology "is a technical discipline, and might also be called ..... the doctrine of the systematic forms of thought. In its universal aspects it deals with the methods of proof and of refutation.". William Pepperell Montague[3] defined it as the study of "the ways of knowing" and subdivided it into two parts: first, logic defined as the study of the ways of attaining knowledge, second, epistemology, defined as the study of the ways of interpreting knowledge and concerned mainly with the relations between the known and the knower. According to Kaufmann[4] methodology is the logical analysis of scientific procedure. There is no agreement on the best research method as options are available for solving virtually every type of problem. "In certain circumstances one method is plainly preferable to another because it makes possible the solution not only of all

problems by the other methods, but of additional problems as well ..... . Very often, however, different methods will coexist within a certain field of enquiry, each leading to certain achievements denied to the others." Hence there is no single adequate approach to all problems. This same conclusion has been noted by Professor Sterling[6], "Since the research methods depend upon the questions and since I am unwilling to place restrictions on methods - this rather sweeping conclusion is likely to be disappointing to those who had expected me to label some research methods as 'unscientific' and to endorse others. I am sorry to disappoint, but this is precisely the attitude to which I am opposed.". He continues, "Although the research methods of all of the scientific disciplines have some general properties in common, the more striking feature is their diversity.". Therefore, methodology has nothing to say on the best way, let alone the only way, by which to approach any problem.

As this particular research is devoted to the analysis of the planning of location of industries in the Sudan, where marked differences exist in different parts of the country between rural and urban environments, and tries to comprehend in its totality the dynamic interaction between industrial location and regional development, we feel that deciding on the right research strategy is a very crucial step in meeting the objectives of this study. To this end our task is therefore to initiate a framework which suits the objectives of our research within three main constraints: (a) element of time, (b) budget, and (c) research environment. Regarding the first two resources, the writer had to comply with the limitations imposed by his sponsor - the University of Gezira; and since the fieldwork

was done in the Sudan, the environmental variables were taken for granted.

In broad terms, as this research is empirically oriented - ie, aims at drawing conclusions through the description, analysis, and evaluation of data collected - and to make our task more specific, we have elected to discuss the following issues in this chapter:

(a) Field research as a domain of empirical research,

(b) Methods of field investigations,

(c) Aims of the research,

(d) Research framework,

(e) Research procedure.

It is our intention at this stage to make it clear that we are not branding this approach as the most ideal way to handle the problem at hand, but such an approach, albeit tentative in its nature, will help in developing our framework, which is in our own conceit, best suiting this study. Furthermore, we would like also to lay stress on the fact that no research method is perfect, and it is possible to criticise any research effort. But what matters in this context is that research flaws need not be so grave as to invalidate the research. Perhaps one agrees with Homans[7] who argued that there were neither good nor bad methods but only methods that were more or less effective under particular circumstances in reaching objectives to a distant goal.

It is, therefore, the nature of the problem, the available resources (time, money, manpower) and constraints that dictate the appropriate research method. Indeed, it is a thrill that almost anyone can

experience to start with a problem which is defined properly and connected logically to the environment from which it is drawn, work enthusiastically and hard, and proceed with caution to avoid deficiencies in the conduct of the research itself.

3.2 Field Research: An Overview

Field studies have opened up new possibilities for the development of social sciences. For one, they are breaking down the narrow walls of the traditional laboratory study and hence our knowledge is increasing as a result of the direct study of the field situations. For another, field studies allow us to explore boundary conditions which may serve to enhance our understanding of the problem at hand. An example of boundary factors is range; phenomena in the field often show a far wider range of variation than could be simulated in the laboratory. A case in point is cross-cultural studies which can often extend the range further.(8) Another factor is intensity; an independent variable may display a range of intensity in the field that could not be generated in the laboratory, because of ethical and other restrictions. For example, firings and layoffs do occur in the real world of work, however they can produce levels of stress that would be unethical for a researcher to simulate in a laboratory setting.

According to Murdick(9), the major steps involved in field research include the following:-

(a) Finding a good research problem and exploring it through

a.1 collect information which is important

to the problem at hand

a.2 define exactly the problem area.

(b) Establish the purpose of the research. This can be important in deciding how to carry out the research.

(c) Estimate costs to be allocated in a trade-off between benefits of accuracy and the costs of error.

(d) Define the population of the respondents.

(e) Select the sample.

(f) Design the research so as to overcome the main obstacles.

(g) Plan and implement the field operations.

It is worth mentioning that the field researcher might face staggering blocks, disruptions, high costs, and so on under his feet, which might make his task difficult, if not impossible. The following problems are not exhaustive, but rather selective. Firstly, the problem of accessibility. Field research is, or has been, conducted by different nationalities in almost every nation in the world. Entry of a field researcher in some areas is in itself a difficulty. To illustrate the point, Southern Sudan has for some years been almost completely closed to any outsiders for any purpose. The Arab-Israeli War of 1967 has made field research impossible in much of the Middle East. Periodic restrictions on the movement of foreigners for whatever purpose on the grounds of security, make any movement difficult except in major towns and along main roads. The major part of Saudi Arabia has rarely been open to independent field researchers. Now in Afghanistan, researchers from Western countries are likely not to be admitted due to the association of the present regime with the Eastern bloc

and the subsequent political tension with Western countries. Fortunately for the purpose of this particular research, the author being a Sudanese National, did not envisage facing any difficulty in gaining entry to Sudan.

Secondly, if entry is permitted, limitations imposed make completion of the field work almost impossible. In some African countries, the researcher may not have a free hand in choosing the problems, he may investigate, and the material he may publish. Anything viewed as an offence against the government may lead to his expulsion. Furthermore, the researcher finds varying responses to his presence in the area in which he is to work. The main problem is to find somebody to talk with who will understand and take the necessary action. Although this particular study was carried out in theSudan, we found that personal introduction was helpful and necessary for the completion of the field work. The accepted procedure was to work from the top down through the bureaucratic hierarchy. Problems may crop up if one bypasses some part of the chain.

Thirdly, perhaps the most difficult threat which meets the researcher at the field arises from suspicions and mistrust from the side of the respondents. According to theory, under conditions of 'trust' people discuss freely what they know well.(10) To complete the field work for this study the researcher found it important to provide conditions that maximized trust and met the emotional and intellectual needs of the respondents.

Fourthly, the researcher faces problems of time and money. Field

work of any sort is expensive.[11] It will get even more expensive with the development of sophisticated instrumentation and more expensive and powerful research designs.[12] Field researchers worry most about high-dross rate, ie, many 'irrelevant' events occur and are recorded before something significant happens, and therefore much time and money is spent for very little useful information. But according to Baker[13] this is not always true as "data that are dross for one investigator are gold for another.".

3.3 Methods of Field Investigation

Having discussed briefly some of the problems that are likely to crop up, it is worth discussing at this juncture the main methods that can be applied in field investigation. Yet none of them is free from pitfalls. According to Lerner[14] field researchers should examine dispassionately the advantages and disadvantages of every established technique in terms of the relevant situation and the specific questions that are being asked. Appropriate combinations, however, may provide better answers than any single method can. For example, a post card survey, in conjunction with a handful of intensive interviews, may better reveal how people feel about an election and thus allow drawing robust conclusions. The virtue of using appropriate combinations is that one is not subject to the same pitfalls as are the others.

The major methods of field investigation are: (a) interviewing, (b) questionnaire use, (c) observations, (d) case studies, (e) documentary studies, (f) survey studies.

3.3.1 Interviewing

This method is widely used in a number of ways. First, it may be employed during the early stages of a study to help to identify the relevant dimensions. Second, it is used as the main data collection technique. A third role, is to clarify things which emerge from the use of other techniques. Merton and Kendal[15] show that when the experimental variable is a complex one, interviewing may indicate what aspects of the experimental procedure are responsible for observed effects. Fourth, it is employed in the study of traditional psychological problems. The researcher's interest may not be what the respondent says but how he says it; in such a case what matters is the interviewer's rating of the respondent's reaction to the interview itself.

The two major types of interviewing are standardized versus unstandardized interviews classified on the basis of question format. They are generally referred to as structured versus unstructured interviews.[16] The question format of standardized interviews can take a variety of forms, for example, multiple choice, true-false, yes-no, agree-disagree, and like-dislike. However, with unstructured interviews, the questions are as open as possible and offer a minimum of guidance to the respondents. This method has been advocated by Rogers[17], Roethlisberger and Dickson[18], Piaget[19] and Kinsey et al[20].

The merits of standardized interviews are threefold: (a) they make information more comparable, (b) they are more reliable, and (c) they minimize errors of question wordings. On the other hand,

unstandardized interviews are advocated on the grounds of flexibility and that they encourage more true-to-life replies. The proponents of this method point out that the same words mean different things to different people when the researcher uses standardized questions, and, therefore, one has not standardized the meaning of questions to the respondents.[21] The ambiguity arises from the fact that each individual interprets spoken or written communication from his own experience and personal viewpoint. The dangers are perhaps too obvious to need recounting. For one, some respondents will be talking about one thing and others about something else. For another, interpretations and classification of the answers is hampered because there will be too many answers which do not fit the intended scales.

We have already mentioned the virtue of using complementary methods in field studies, and, in line with that, the appropriate procedure here is to use a mixed strategy when interviewing. Merton and Kendal have advocated the use of a semi-standardized interview which employs an interview guide but gives the researcher considerable flexibility within the framework of the interview. As personal interviewing is one of the methods adopted in the process of data collection for this study, the researcher elected to employ a mixed strategy as a means of interviewing his respondents. The benefits of this mixed strategy will be discussed later.

In some cases, indirect questions are used when the respondent is unwilling to divulge directly the data the researcher wishes to secure, as the subject matter of the study is likely to give rise to resistance. However, when the entire thrust of the interview

is predicated on the assumption that directness and clarity maximize the productivity of an interview, this technique is categorically avoided as there should be no games and the interviewing process should not be dishonest. Cannel and Kahn[22] cite four circumstances when indirect questions may be suitable; (a) when respondent and interviewer are on different "wave-lengths" about a concept and, therefore, do not share a common understanding of it; (b) when respondent cannot report answers due to emotional fears; (c) when the information is very high on social undesirability; and (d) when the stimulus material is too complex to be presented in verbal form.

3.3.1.a Motivating the respondents. The respondent motivation is an important condition for successful data collection. There is no agreement about the best methods of motivating respondents; but sources have been conceptualized in a number of ways. Kinsey et al[23] lay emphasis on altruism as the initial source of respondent motivation. Cannel and Kahn[24] advocated intrinsic motivation when the experience and relationship with the interviewer is valued by the respondent. Richardson, Dohrenwrd, and Klein[25] stressed the more common sources: altruism, emotional satisfaction and intellectual satisfaction. Such partial agreements reflect the more general diversity of motivational theories. However, some tactics may be useful in achieving this end: first respondent motivation is to be visualized in terms of the social situation of the interviewer and respondent, of the nature of the transaction between them and of their mutual perceptions of eachother. All in all, the interview is to be treated as a social process and the data collected should be regarded as an interview product.

Secondly, it is important to maintain neutrality. The researcher must be impartial and must not allow himself to be identified with any group which may affect the respondent's answers. Thirdly, it is also equally important to maintain confidentiality. Under no circumstances should the researcher reveal anything about any respondent to another respondent. According to Gullahorn and Strauss[26] the field researcher must adhere to strict confidentiality even when the data thought is common knowledge. Violations of confidentiality is not ethical as well as displays incompetence. Finally, the interviewer must identify himself, as respondents should know who is interviewing them, and why, and in a gerneral way, who is sponsoring him.

3.3.1.b Recording Interview Data. There are three major possible ways of recording respondents' answers. To write them up from memory is one method. The interviewer attempts to remember as much as possible of what the respondent says and writes the content after the interview. But this method suffers from distortion resulting from the interviewer biases. It also involves a considerable loss in the sheer amount of interview content that can be retained. Symonds and Dietrich[27] found that memory write-ups contained (a) 39 per cent of the interview content if the write-up was done immediately after the interview; (b) 30 per cent after a lapse of two days; and 23 per cent after a lapse of seven days.

Another method is that of mechanical recording. The respondent talks into a microphone where his replies are recorded onto a tape. This method is gaining in popularity due to technical developments in mechanical recording devices. It can have a good deal of

importance because it produces the entire content of the interview. It has been used with or without the respondent's knowledge; but there are ethical questions involved here. The justification for not telling the respondent rests on the grounds that one can obtain more information and candid expression of opinion when the respondent does not know he is speaking "for the record".

In our opinion, this method is out of the question in a country like the Sudan, for three major reasons. Firstly, respondents, particularly government officials, refuse flatly to be taped. Their fears arise from suspicions that the researcher may have hidden purposes and will report the content of the tape, which may contain sensitive material revealed during the course of the interview, to the authorities. To these officials, a verbal promise to maintain confidentiality is not sufficient. Secondly, it is almost impossible to conceal the recorder, as the interview usually takes place at the respondent's office. Thirdly, even if it is possible to conceal the recorder, the researcher considers such an act as unethical, and will not dare to use it at all.

The third method is note taking; and this is simply taking notes while the respondent is talking. Fortunately, interviewees in the Sudan do not object in the least to the taking of notes while they are answering questions. Our respondents in particular regarded it as perfectly natural behaviour, and it is interesting to note that some of them found it flattering that someone considered their views important enough to be written down. Statements like "I hope you do not mind taking some notes," or "taking some notes helps me to remember what you said." were very helpful in such

situations.

3.3.2 Questionnaire. Both the questionnaire and its stepbrother, the interview, capitalize on language as a common means of communication. Asking someone a question saves considerable time and effort if an answer is supplied. However, the language of the questions must conform to the vocabulary level of the respondents. The form and content of questions is limited by the shared vocabulary between researcher and respondents, as well as subject matter, complexity and conceptual level of the topics under consideration.

The most obvious practical differences between questionnaires and personal interviews are time and money. Questionnaires can be administered on a group basis which makes it much quicker and less expensive than personal interviews. Furthermore, some of the problems relevant to interviewing, such as that of interviewer's errors, or interviewer-respondent relationship as a source of bias, are largely eliminated with questionnaires. Metzner and Mann, in a study at the Survey Research Centre, University of Michigan, reported that questionnaires elicit much the same answers to most questions as open-ended interviews. Where the two methods yield differing answers, the questionnaire again apears to be superior, in that the questionnaire answers predict an outside criterion of productivity better than the interview answers.(28)

However, one cannot draw conclusions that the questionnaire is superior to the interview, as the former suffers from a number of problems which the personal interview should help to overcome. Firstly, some respondents check alternatives in a questionnaire in a careless manner. In face to face interviews, the interviewer handles the recording the answers and can indicate when the respondent has no information on the subject. Secondly, the interviewer can always introduce himself better in a face to face interaction, hence, presumably, improving rapport. Thirdly, the interviewer can usually obtain answers to his questions, whereas with questionnaires, a respondent can fail to answer a question if he so chooses. All in all, the interview permits a higher level of control over the sequence of questions. There is always the danger that a respondent when given a printed questionnaire, may glance ahead, reading later questions before answering earlier ones; thus efforts made by the researcher to prepare the questions consecutively will be nullified. Questions which are not applicable to all respondents can be omitted by the interviewer without the respondent's knowledge; thus each interviewee is asked the relevant questions.

3.3.3 Observation. Observational methods are techniques for gathering information without direct questioning on the part of the researcher. These techniques are used by a wide range of social scientists. For example, anthropologists observe by participating as closely as possible in the experiences of those whom they study. According to the

Webbs[29] all social research begins and ends with observation. In fact, they made it one of their principles to start with observation. "An indispensable part of the study of any social institution, where even this can be obtained, is deliberate and sustained personal observation of its actual observation."[30]

The main advantage of this method is that it makes it possible to study behaviour as it occurs. This enables the generation of first hand data that is free from factors standing between the researcher and the respondents. A second advantage is that the elements of artificiality introduced into the research environment by some methods can be minimized especially when those observed do not see the researcher as an intruder, or are not aware of their being observed. As a third advantage, this methods puts the researcher in the context of discovery, and facilitates what Merton calls the serendipity pattern of social research which "refers to the fairly common experience of observing an unanticipated anomalous strategic datum which becomes the occasion for developing a new theory or extending an existing theory."[31] As a matter of fact, many of the most successful discoveries are due to the ability of those researchers who can observe more interrelated things than normal human beings.

3.3.4 Documentation Studies. This method of investigation pursues the course of events from written materials, tapes and other forms of documentation. The major two domains

are primary and secondary records. The first is defined as 'original documents or official files and records', while "secondary sources are publications of data gathered by other investigators.'[32]

The main advantage of document analysis is that it allows the researcher to reconstruct the entire process without the involvement of the original participants. However, researchers are very cautious of its use as it can never be taken at face value. Good examples of studies which showed the limitationsof various kinds of documents are those of Angell and Freedman [33], Made [34], Mann [35], and Webb et al [36].

The basic deficiencies are selective depositing, which happens as a result of exhibiting a systematic bias in favour of certain sets of things; filling in the gaps by researchers who add their own suppositions in an attempt to complete the records; and biases inherent in the research, which may come about as a result of the personal prejudices of the researcher. In spite of these limitations, this method has been used extensively in organizational behaviour.

3.3.5 Case Studies. This method is used when the researcher wants to obtain a wealth of detail about the subject. According to Gibson et al[37] it is an attempt "to examine numerous characteristics of one person or group, usually over an extended period of time".

It is appropriate when finding clues and ideas for further research.

Since case studies are not accompanied usually by experimental design or control, and are performed in muddy waters, where the variables and parameters are largely undefined, the method depends upon the commonsense, experience and imagination of the researcher. Beginning with little or no knowledge of the situation, the researcher constantly reasseses what is important and what is unimportant. It sometimes requires long and hard work. To some anthropologists case studies of less than several years' duration are likely to be misleading. According to Malinowski[38] "there is a series of phenomena of great importance which cannot possibly be recorded by questioning or computing documents but have to be observed in their full actuality. Let us call them the imponderabilia of actual life."

The length of time required to understand a system is considered as one of the shortcomings of this method. The researcher requires a great deal of time and space to make his findings, the significance of which depends upon the circumstances which he cannot control. Other problems arise as a result of the researcher's intention to study a whole system which requires a continually expanding boundary, but at the same time, wants thorough detailed study of the important variables. According to Diesing[39] the researcher "cannot satisfy both of these contrary requirements fully; no matter which way he turns, his work will lack something - incomprehensiveness, or

incompleteness or both."

3.4 Research Framework

We have already discussed in the first three sections of this chapter the characteristics, difficulties and methods of field research. We pointed out that there is no single best method in any absolute sense. In line with the above, our task is to develop a plan that can serve as a framework which will aid us to conduct the research in a systematic way. Since the Study is empirically oriented, and falls within the descriptive range in presenting data collected, we have elected to construct brief case studies following personal interviews, observation and collection of relevant documents. The overall approach is behavioural as it yields valuable insights into actual manufacturing location patterns. To this end, the salient features of our framework are discussed below:-

3.4.1 Purpose: The major issues of this Study are centred round the following areas:-

(1) To what extent the theoretical framework of industrial location explains the situation in the Sudan. This involves analysis of the various factors influencing planning of industrial location in that country. The emphasis here will be on the impact of infrastructure in planning of industrial location. More specifically, road, railways, power, water and other facilities.

(2) To what extent have these factors tended to bring concentration of industry in Khartoum area than the peripheral?

(3) The role of central government in planning of location. This brings the influence of incentives on plant location decision. The theoretical appeal of an incentive is apparent. But to what extent is it in reality effective? How can the government achieve the strong option, ie, develop policies and programmes to attain more balanced rates of urban population growth across the country? The emphasis here is on two major questions:

(i) What are the different forms of government intervention in influencing the investment location decisions?

(ii) What key policy reforms are required to correct the present locational maladjustments?

(4) The industrial location decision making process.

3.4.2 Limiting Assumptions and Definitions.

(1) Manufacturing in this Thesis is defined as "The mechanical or chemical transformation of organic or inorganic substances into new products whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home and whether the products are

sold at wholesale or retail."[40]

(2) The survey was confined to Khartoum province due to the following reasons: (a) more than 73 per cent of all manufacturing industries are located in this area; (b) Khartoum contributes over 66 per cent of the total manufacturing production and employs about 65 per cent of the industrial labour force; (c) capital investment in these industries accounts for almost half of all capital invested in the manufacturing industry in the country.

(3) Firms employing less than ten were exluded from the study for two reasons: (a) There is no available list of such firms in the files of the Ministry of Industry and Mining; (b) In the opinion of the researcher, such small firms do not keep records of basic data and their response rate to surveys is negligible.

(4) Data collected from files and documents are assumed to remain unchanged. This does not mean they are correct, but merely that they are not falsified, through the very process of investigation.

(5) The decision process is the process used in response to a locational problem.

(6) Environmental factors in the Sudan - political, economic, cultural, educational and social - are taken for granted. However, their impact on the

planning and decision processes will be shown.

3.4.3 Preparatory work and field research. The field work was carried out in the Sudan between September 1979 and January 1980. Undoubtedly some difficulties surrounded the personal interviews and collection of data. Firstly, it goes without saying that looking for documents and picking information in developing countries is a painstaking job. The Sudan is no exception. Government units do not bother updating their records and thus if suffers from major gaps, important overlaps and duplications, and inadequate timelines. The usual practice is that reports and other documents find their way onto a shelf or into a bottom drawer because the person who receives it is not sure of the relevance or utility of the information. Then, when the information does become relevant no one is quite sure where it is or who has it.

Secondly, many development projects in the Sudan are funded by overseas aid organizations and it tends to be these organizations which stipulate what kinds of feasibility studies or evaluations of past experience should be carried out before funds are granted. The reports usually arrive on a desk in Khartoum. The raw data, upon which the report is compiled is in an office abroad under Confidential cover.

The author has endeavoured very hard to get information out of ministries and parastatal bodies at the Centre. But, how much information one can obtain from the Centre depends upon how well one can argue one's case, and how well one knows how to approach the

right people. The problem therefore, was to break into this circle!! It is not a secret that informal systems in the Sudan are so strong that in certain cases they may even interfere with the functioning of the formal systems; and people there see themselves as a part of a web of relationships. This has a large role in the life of the individual. It is a burden on his back and a cushion under his knees. The key, therefore, was to find someone whom I knew personally, and whose informal introduction was very helpful and necessary for eliciting the co-operation of others. Luckily some of my colleagues in the Ministry of National Planning in Khartoum were interested in the Study and helped very much in introducing me to other government departments.

Thirdly, many of those interviewed were managing directors whose secretaries are very skilled in putting of people like me. However, using the names of the University of Bath in England and the University of Gezira in the Sudan gave me the green light in most cases. Furthermore an introductory letter, introducing the topic and researcher, was handed to the respondents. Indeed, they are entitled to know the nature and purpose of the study on which they are being interviewed. To avoid giving too long and too complex introduction, our introductory letter has been worded in a precise and concise manner.

The disturbances which occurred during the course of some interviews created a fourth difficulty. At the beginning I could hardly enjoy an interview which was free from an influx of visitors, subordinates seeking advice or even telephone calls. In one interview, the general manager left me in his office to inspect the

mill; and a further appointment to see him could not be arranged until four weeks later. I partially managed to solve this problem by fixing the times of interviews in the evenings. But even the evenings were not free from disturbances - mainly cuts in the public electricity supply. During my fieldwork, cuts in electricity supply have become commonplace for residents of Khartoum, as indeed, they have for inhabitants of most of the large towns in Sudan that are supplied with electricity. "The blackout killed the yeast and we have to import special supplies from Britain and Egypt." said one of the managers. These cuts did not have any mercy on my evening interviews; and in some cases I found myself back to square one, facing the problem of arranging for another meeting.

Suspicion added a fifth dimension to the set of problems. A side effect of being introduced by a powerful third party is that the researcher will be associated with him in one way or another. This problem became clear with some government officials with whom I experienced difficulty in getting them to speak their minds. I managed (in a typical Sudanese way) to bridge this problem and provide a climate of trust and mutual understanding which also helped in establishing a very constructive rapport.

3.4.4 Interview guide. At the very start of the research, I considered using questionnaires as they are quicker and less costly to run. But this idea was abandoned for a number of reasons. For one, I am fully aware that Sudanese people prefer to speak rather than writing down their thoughts. For another, however good the questionnaire, however appealing the glamour of Bath and Gezira universities, as sponsors, it still remains extremely difficult to

encourage managing directors and government officials to spend time and do the required writing. A third reason has been the nature of the study which requires more probing and follow-up questions, particularly when discussing policy issues with government officials. All this suggested that personal interviews were a more powerful method.

On the basis of the above, decision has to be made regarding the procedure for designing and conducting the personal interviews. I elected to follow a semi-standardized technique which allowed me to design an interview guide but gave at the same time considerable latitude within the framework of the interview guide. Accordingly, the investigation guide was not given to the interviewees, but I used it as a framework for leading discussions (see appendix C for the investigation guide). I found this method helpful in steering the respondent into the appropriate frame of reference, whenever I felt that he/she was "off base". I also found that this method enabled me to elicit most, if not all, of the anticipated and unanticipated responses. Furthermore, close adherence to the investigation guide may minimize the range of the personal interview. In any case, adhering rigidly to the question: ie, word for word is not at all appropriate in our case, for two reasons. Firstly, all the respondents speak Arabic; and there is no way of interviewing them in English. Therefore, some changes are bound to occur in translating from English to Arabic. Secondly, and more importantly, there are some variations in the educational levels of the respondents. It is quite possible to find a managing director who is not educated at all, however, it goes without saying that he is always the owner of the business. Consequently, the language of the questions must

conform to the vocabulary level of the respondents. This does not mean that I have to imitate the linguistic informalities of the respondents, but words selected must be clear and understandable to them.

3.4.5 Pilot Study. Choosing personal interviewing as one of our field methods, made it necessary to run a pilot study. The objectives behind the pilot survey were threefold; (1) to determine the time needed for the interview; (2) to learn about the mechanisms of interview presentation and gain some experience; and (3) to make sure that the content of the investigation guide is in line with the aims of the research.

Contacts were made with three companies in the South-West region of Britain, but unfortunately, for one reason or another, a negative reply was the result. This led me to decide to interview three firms in the Gezira Province in Sudan for the same purpose. The question areas were also put to Professor R E Thomas in his capacity as the Pro Vice-Chancellor of the University of Bath.

After arriving in Sudan, and before embarking on implementation of the field work, I decided to initiate contacts with Sudanese practitioners and academics to sharpen my ideas about the most appropriate methods of approaching respondents.

Regarding the first objective, the questions took about two and a half hours to complete. As regards the second objective, the major lessons learnt related mainly to controlling the development of the interview and planning the order which should be adopted. Flexibility

is another added bonus, as the inteview is not a 'cold' instrument, but develops its own momentum and can take both the researcher and the interviewee along a number of different paths as it develops. Moreover, special attention was drawn to the division of the interview into three segments - opening, main body, and ending; this segmentation is not discrete since the beginning of the interview must roll into the middle and on to the ending. I have also been particularly aware that a poor beginning can affect adversely the main body, and can make it very difficult to undertake the interview; hence it is at this point that the need for 'softening up' is most important. Furthermore, the process is not an interrogation of the respondent; it is a conversation with purpose. It requires attention and ability to reflect back. Other lessons related to the creation of an atmosphere of trust; there should be no games, and nothing is dishonest. Silence is a good indicator. It is wise to persevere for a time, as silence on the part of the interviewee could either mean that he does not have a well-structured answer, or it could have another significance. Last but not least, the greatest possible length of time should be given to the interviewee in answering the researcher's questions.

Regarding the third objective, the questions were found to be adequate, though some minor changes and additions had to be made.

3.4.6 The Sample. The choice of the Sample was influenced by a number of considerations. First, the nature of manufacturing sectors in the Sudan. Two major sectors can be clearly identified; (1) the agricultural sector which is subdivided into food and non-food industries. Each of these major groups includes a number

of individual industries. (2) The non-agricultural, which is also divided into two groups - non-agricultural manufacturing and fabrication and service industry. The two major manufacturing sectors together have 32 individual industries, 30 of which are represented in Greater Khartoum industrial area. Secondly, time and money; the short period of the field work, coupled with the limited financial resources dictated that all the companies to be visited (except one) should be located in Greater Khartoum industrial area. Moreover, the centralization of government machinery in the capital city of Khartoum, with hardly any effective branches elsewhere, necessitated the presence of the researcher in the capital city, to conduct the personal interviews with government officials and collect the data from the relevant departments.

An initial list of companies to be approached was obtained from the Ministry of Industry and Mining. Two companies from each of the 30 individual industries located in Khartoum were chosen at random. An introductory letter was sent to the managing directors of each of these companies briefly outlining the purpose of the research, its sponsorship and then requesting for an interview. Of the 60 companies approached, 38 companies were interviewed. The 64 per cent acceptance rate was about the anticipated figure.

3.4.7 Data Collection. We have already identified two types of data - primary and secondary. In our case, primary data was collected from personal interviews, original documents and official files and records during my field work in the Sudan. Brief notes were taken during the interviews using my own brand of speedwriting and abbreviations. To avoid any possible loss of information, two

methods were used: (a) I elected to include in my notes the most important parts of the answers - the 'meat' of the answers; and (b) to write up the inteview immediately. I found these methods helpful in not mixing the remarks of different interviewees. The cardinal law which I followed very strictly was not to take any interviews between the taking and writing-up of a particular interview.

Apart from some problems which surrounded the personal interviews, the general atmosphere was friendly and the reception given was cordial. Some of the officials of the Ministry of National Planning who expressed interest in the project were very helpful in minimizing the possible inhibition by other government officials. As a result, original documents and published material were made, to a greater extent, available. As some of the information was provided in confidence, its source and identity would not be disclosed, and every effort would be made to honour this agreement.

Regarding the secondary data, this was available through libraries and documentation centres, including Khartoum University Library, Sudan Library; Triad Natural Resources (Sudan) Limited; Research Information Unit; Central Bank of Sudan Research Section Library; National Documentation Centre of the National Council for Research; Ministry of Education Documentation entre; Ministry of Industry; Industrial Consultancy Institute Library; and many others.

3.5. Research Procedure

The different stages which this research has gone through are shown in figure (3.1). The sequence of the stages is as follows:-

(1) Review of the theoretical conceptualization of the main elements of the study carried so far. This was extended to include the different models of industrial location, and the empirical work on the subject.

(2) Deciding on research strategy and designing the interview guide.

(3) Contacts with the Sudanese government to authorize the field work in the Sudan.

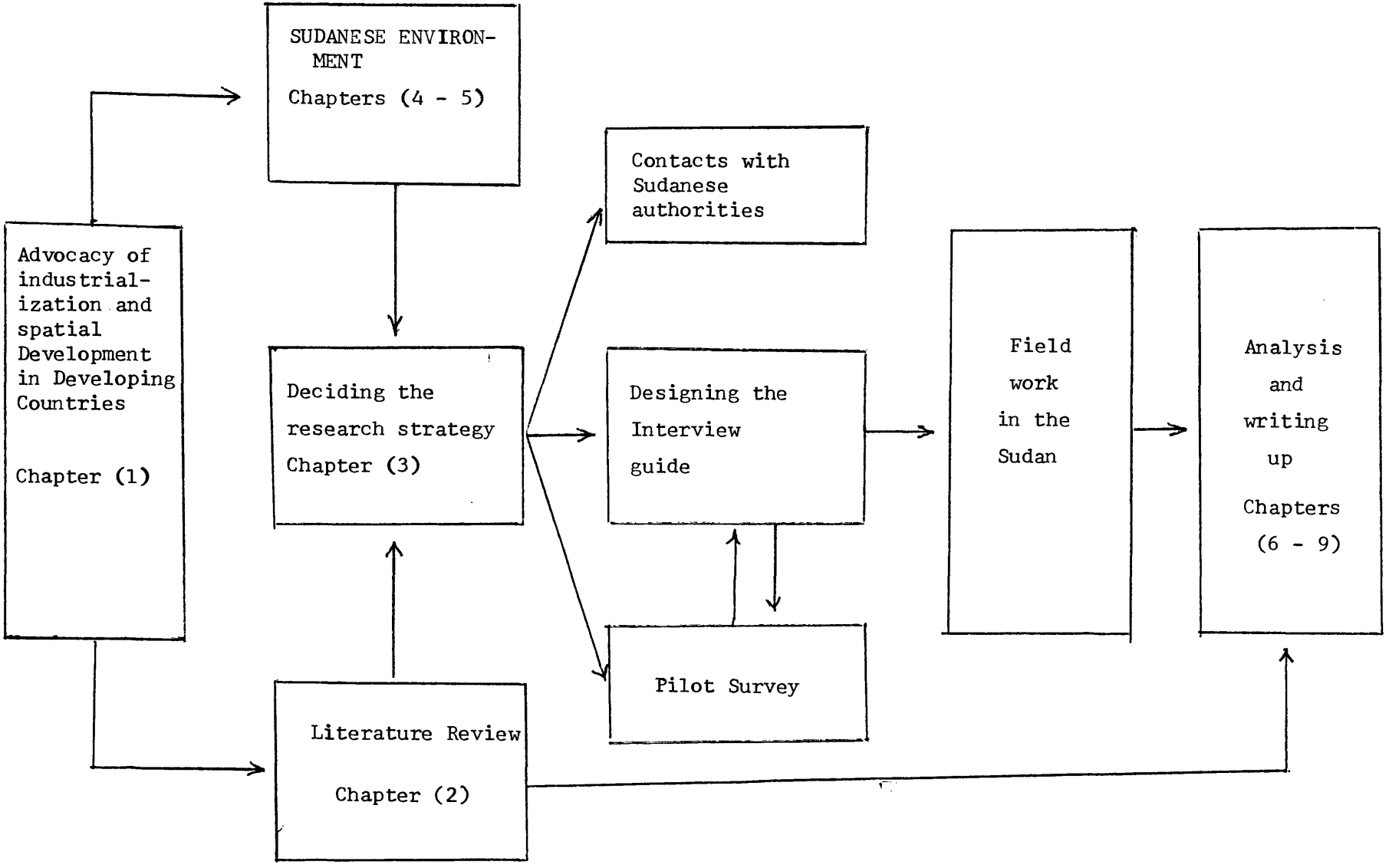
(4) Contacts with some firms in the South West region of Britain to do the pilot survey.

(5) Field work carried out in the Sudan.

(6) Analysis and writing-up.

Research Procedure

Figure 3.1



CHAPTER FOUR

CHAPTER FOUR

GENERAL BACKGROUND TO THE SUDAN

4.1 Prologue

Sudan is a bridge between black Africa and the Arab world, combining an Arab culture in its Northern provinces[1] with black African traditions in the South[2]; and in the jargon of the Third World, Afro-Arab. It is the largest African nation in area. The country is bounded on the south by Uganda, Kenya and Zaire; on the north by Egypt; on the east by the Red Sea and Ethiopia; on the west by Central African Republic and Chad (see Map 4.1). Its total area of about one million square miles (250 million hectares)[3] represents slightly more than eight per cent of the African continent and almost two per cent of the world's total land area.[4]

The year 1881 signalled the Egyptian conquest of the Sudan and some form of centralized administration began to emerge, particularly in the north. The country was divided into provinces and districts and Khartoum was named as the new capital of the country.

The Mahdist Movement (1882-1898) was a brief interlude during which the Turko-Egyptian government was withdrawn and nationalism asserted itself in the Sudan. During the rule of the Mahdiya, the Sudan was

indulged in internal as well as external wars and consequently, efforts to develop the country's resources were negligible. The defeat of the Mahdists at the Battle of Omdurman in 1898, was the start of a long period of the Anglo-Egyptian Condominium. The 1899 Condominium Agreement separated the administration of the Sudan from that of Egypt. In theory it was a "joint rule" but in reality it was dominated by the British as Egypt itself was under the British control.(5)

The British administration brought new patterns of political and economic order. They brought in their concepts of government, landownership and civil service and they also began to build an infrastructure. In Khartoum and Blue Nile provinces, traditional subsistence agriculture was replaced by the introduction of cash crops. Prior to 1918, most of the total capital expenditure was spent on the construction of railways, harbours, and river steamer services.(6)

After the First World War the Gezira Scheme(7) got under way, and the Dam at Sennar was completed in 1925. Another important development in the Sudanese economy was the introduction of pump schemes along the Nile and its tributaries. The number of private pump schemes grew from 372 schemes irrigating 170,000 feddans in 1944, to 2,229 schemes irrigating 777,000 feddans in 1957.(9) Urban groupings emerged with a new taste for consumer goods as a result of cash production, the encouragement of export trade and some local industry. Economic change resulted in considerable change of Sudanese society according to modern characteristics; and an educated elite and a broad base of tenant farmers and an industrial

urban labour force began to emerge. In this period there were ups and downs regarding the economy because of world economic events and internal political turmoil started by the nationalists demanding independence.(10)

The year 1956 witnessed the declaration of National Independence and hence ended a period where the Sudan had the unique experience of being the only country in Africa to be at one time a colony of two countries, Britain and Egypt.

Independence did not bring the peace and prosperity that the country longed for, and parliamentary instability invited a military coup in November 1958. The military regime continued in power till 1964 when civilian rule was again restored.

The May 1969 revolution brought about the present regime into power and for the first time, and having learned from past experiences, the government is trying to set the scenario for a more effective utlization of the country's resources in quest for a faster rate of economic and social development.

Up to 1971, the government has been highly centralized in Khartoum. Under the provisions of the people's Local Government Act 1971, operations in all fields other than foreign affairs, national defence and justice are to be decentralized to the 15 provinces.(11) (See Map 4.2.)

4.2 Geographical Situation

The country stretches between latitudes $3^{o}N$ and $23^{o}N$ and longitudes $21^{o}E$ and $39^{o}E$. Stretching more than 1,200 miles from north to south and 1,000 miles from east to west, the country contains a range of climates from tropical forest to some of the dryest deserts in the world, in which the one unifying link is the Nile, and includes people from very different ways of life, religions and cultures.

The White Nile enters Sudan from Uganda in the south where it is called "Bahr el Jebel". Fed by a number of streams in the south west of the country, the river passes the town of Mongalla and enters the Sudd region which is characterized by several large swamps. It is estimated that about 50 per cent of the White Nile water is lost through evaporation in the Sudd's 100,000 square miles - probably the largest swamp in the world.(12) After about 500 miles the river is joined by Bahr el Ghazal which drains the rim mountains of the south west that form the watershed between the Nile and the Congo Rivers. A short distance later it is joined by the Sobat River. The White Nile flows northward, leaving tropical Africa and at Khartoum it is joined by the Blue Nile which originates from Lake Tana in the Ethiopian highlands. Between the two rivers, near the junction is the famous Gezira Scheme. North of the Junction the rivers become the Nile River and continues north towards Egypt.

Away from the Nile, the Sudan is mainly a plain land and plateau country, although there are a number of important mountain ranges

such as the "Imatong" and the "Nuba Mountains" in the south, "Jebel Marra" in the west and the "Red Sea Hills" in the north east.

4.3 The Climate

By virtue of its geographical position the Sudan has a continental tropical climate, but as it stretches from 3^{o}N to 23^{o}N latitude differences in rainfall and temperature are considerable. Temperatures increase during the sumer with Khartoum averaging 92 degrees in June.(13)

Most of the country is within the region of summer rainfall, which diminishes from south to north. The Southern Sudan, with a rainfall from 1,000mm to 1,500mm per annum, lies just outside the equatorial region of almost continuous rainfall, and, along the Southern border, the rainy season lasts nearly nine months. The rainfall becomes less in amount, the season shorter and the distribution more irregular till at about 19^{o}N latitude regular rains disappear completely. (See Map No 4.3 which gives a general picture of the distribution and amount of rainfall in Sudan.)

Because of the higher latitude and lower rainfall there is a marked difference between summer and winter temperatures in the Northern Sudan, the summer being very hot and winter relatively cool for a period of three or four months. Moving southwards, both the seasonal temperature range, and the daily range become less.

In the winter, the northerly air mass is in complete control and is relatively cool and dry bringing no rain except when they blow

across the Red Sea. Overall, the main characteristic of the climate is not a positive one for the Sudan. Lack of rainfall is a problem, especially in the central region. This keeps large tracts of land out of rain cultivation and forces man to rely upon pastoral activity or irrigation.

4.4 Vegetation

Vegetation responds to climate as it ranges from desert in the north to almost forest in the south. The desert in the north forms about one fourth of the total area.(14) It is followed by semi-desert, low and high rainfall savanna and mountain vegetation regions. (See map 4.4.)

Acacias are characteristic of central rainlands, merging from acacia short grass woodland at the dry end to acacia tall grass woodland at the wetter end. Cultivation, grazing and possibly natural vegetation cycles have caused treeless areas specifically at the drier end of the central rainlands. The characteristic vegetation of the south and along the Ethiopian boarder is broad leaved grass woodland. The south east is dominated by a wooded grassland complex. In "Jebel Marrah" and other northern mountains, rainfall is still the main factor limiting vegetation.

Of the Sudan's total area of 597 million feddans about 200 million are suitable for cultivation, of which 80 million feddans represent rangeland. Currenly, 17 million feddans are under cultivation, 4.5. million are irrigated and the remaining 12.5 million feddans rainfed cultivation.

4.5 Population and Manpower

4.5.1 Size and Distribution. The first comprehensive population census of the Sudan was carried out in 1956. The population was reckoned to be 10,263,000.(15) Of these, males and females accounted for 50.6 and 49.4 per cent respectively. About 27 per cent of the population was in the provinces of the south and the rest (73 per cent) was in the provinces of the north. The population was unevenly distributed amongst the provinces. The major concentrations of populations were in Blue Nile Province, Kordofan and Darfour. Estimates based on the provisional results of 1973 census indicate that the total population has increased to 14.7 million. While the three provinces contain the largest concentration of population, as eighteen years earlier, differential rates of growth are indicated (Table 4.1). It is also obvious that Khartoum, Blue Nile and Kassala have the highest rates of population growth between 1955-73 and their rates of growth are higher than that of the national average. This is not surprising because most of the developments in recent years have been concentrated in these regions.

In terms of density per square kilometre, the country is sparsely populated (5.9 persons per square kilometre, which is by far below the African average of nine persons per square kilometre).

Population has grown far more rapidly in urban areas where the rate of growth is 7.4 per cent (see Table 4.2) a rate which is higher three times than the national average and five times of the rural regions. The disparity between urban and rural population growth

Table 4.1[16]

Population by Province 1955-73

Province	1955-6 Census	%	1973 Census	%	Annual growth rate
Darfour	1,328,765	12.9	2,139,615	14.5	2.7
Kordofan	1,761,968	17.2	2,202,345	14.9	1.3
Khartoum	504,923	4.9	1,145,921	7.8	2.7
Blue Nile	2,069,646	20.2	3,740,405	25.3	3.2
Kassala	941,039	9.2	1,547,475	10.5	2.8
Northern	873,059	8.5	957,671	6.5	0.5
Equatoria	903,503	8.8	791,738	5.4	-0.7
Bahr el Gazal	991,022	9.7	1,396,913	9.5	2.0
Upper Nile	888,611	8.7	836,263	5.7	-0.4
TOTAL	10,262,536	100.0	14,758,346	100.0	2.2

should not be unexpected, since there has been a pronounced pattern of in-migration to the provinces containing the principle urban areas.

It is clear from Table 4.1 that "Darfour", though being a less developed province, has a relatively high rate of population growth which exceeds both the national average for overall population growth and the national average for rural areas. The main reason for this relatively high rate can be the "step migrants" from West and Central Africa intending to move eventually to the relatively more prosperous areas in Central and Eastern Sudan.[18]

It is sometimes argued that the present or future size of population

Table 4.2[17]

Rural and Urban Population

	Population in 1956		Population in 1973		
	No	%	No	%	1956-73
All Urban	737,133	100.00	2,487,730	100.00	7.4
Urban North	690,396	73.9	2,213,014	89.00	7.1
Urban South	46,737	6.3	274,716	11.00	10.9
All Rural	9,525,403	100.00	12,270,616	100.00	1.5
Rural North	6,789,004	71.30	9,520,418	77.60	2.0
Rural South	2,736,399	28.70	2,750,014	22.40	0.03
All Country	10,262,536	100.00	14,758,346	100.00	2.2
All Urban	737,133	7.20	2,487,730	16.90	7.4
All Rural	9,525,403	92.80	12,270,616	83.10	1.5

in a large country like the Sudan should not be a matter of much concern at least in the near future; the Sudan can advantageously afford to have a large population for its potential agricultural and industrial development. This argument can be misleading. In the first place, the potential development may not take place at the required pace, and with the growth of population the living standards fall and unemployment increases. The growth, distribution and composition of population also present varying problems of economic and social development. The dependency burden, for example, would increase.[19] The number of children and young persons below the age of 15 for whom education and health facilities have to be provided would have increased from about 4.5 million in

1955 to about 7.1 million in 1970 and should be about 10.2 million in 1980. The implications of this enormous increase on educational, health and other social policies are immense; these cannot be related to the vastness of the area or the density of the population.

4.5.2 Migration. (a) Immigration: The 1955-56 census recorded that 247,000 persons, ie, about 2.5 per cent of the population, were born outside the country and residing in it, while 259,000 persons were of foreign origin. Of the foreigners, about 80 per cent were West Africans, most of them were pilgrims who stayed in Sudan permanently on their way from Saudi Arabia. The proportion of foreigners in some of the provinces, particularly those of the north east, was quite substantial.

The population and Housing Survey of 82 large and small urban centres in 1964-66 indicated that the percentage of foreigners to total population was 7.3 in small towns and 3.7 in large towns - the total number being 78,930. About 76 per cent of these were from West Africa.

(b) Internal Migration: For various economic, social and religious reasons, the population in the Sudan is highly mobile. It is estimated that at least one million men and women move every year.(20) The 1955-56 census recorded that while about 54 per cent of population born in the Sudan was living outside the locality of birth, only about four per cent of persons born in the country were living outside the province of their birth. The more urbanized provinces of the north east continued to gain while the arid and semi-arid provinces of the north west lost their population.

Khartoum, which is the main urban town, received the largest number of in-migrants.(21)

The mobility of the population is attributed to a number of factors. The major are population drift towards urben centres activated by the push factors as population pressure, lack of job opportunities, lack of rain for good crops and pull factors such as higher average annual earnings, job availability, better education and low costs of migration, due to the presence of friends and relatives; also nomads moving with their cattle for grazing.(22)

It is worth noting that about 50 per cent of migrants in all urban centres were between the ages 18 and 37 and about two-thirds were between 18 and 52 years. On the other hand, the percentages of people permanently resident in towns in these age groups was 25 and 34 per cent respectively. The young population below the age of 17 constituted about 22 per cent of total immigrants (see Table 4.3).

It is thus the young and more active element of population which migrates to towns leaving behind children and old people, particularly females, to till the land or look after the cattle.

The adverse and restraining effects of this trend are bound to be felt on productivity as well as on innovation in agriculture.

4.5.3 Structure. The 1973 census showed that 46.6 per cent of the population was below 15 years of age, 48.6 was in the working age group 15-59 and the remaining 4.8 per cent was above

Table 4.3 (23)

Percentage Distribution of Population of Towns by Age Groups

Age Group	Immigrants	Born and bred in Towns	Total Population
0-7	7.6	35.7	26.9
8-12	7.0	16.1	13.3
13-17	7.5	9.3	8.8
18-22	12.5	8.4	9.6
23-32	14.1	6.7	9.0
33-37	12.5	5.6	7.8
38-52	9.4	4.5	6.0
53-67	18.3	8.5	11.5
68 years & more	8.0	3.7	5.1
	3.1	1.5	2.0
TOTAL	100.0	100.0	100.0

60 years (see Table 4.4).

Table 4.4 (24)

The Percentage Distribution of Population by Age and Sex 1973

Age	Male	Female	Total
Less than 15	47.8	45.3	46.6
15-59	47.1	50.1	48.6
60 and over	5.0	4.6	4.8

The proportion of the population aged 15 and under in the 1955 census was 45.2 per cent. The rise in this figure is attributable to

improved health conditions and eradication of epidemic and endemic diseases and this in turn results in high fertility rate. However, the low proportion of old people reflects that the mortality rates are high and life expectancy is very low. In fact expectation of life at birth in the Sudan is shorter than that in Western Europe by about 30 years.

4.5.4 Labour Force. It is commonly recognized today that the wealth of any nation and the potentialities for economic and social development depend largely on its readiness to develop the knowledge skills and abilities of its people and its ability to utilize its human resources. However, despite great concern about economic development in newly developing countries, little attention is given to the creation of a highly qualified labour force. This has been attributed, in part, to the widespread belief that given a sufficient volume of investment, a respectable tempo of economic development was assured.(25) Nevertheless, some argued that the correlation between the amount of capital received in past decades and the growth performance is very weak in underdeveloped countries.(26)

Two approaches can be used in measuring the labour force; "the gainful worker" or "the active population". The notion of "gainful employment" is not particularly suited to an economy with a large subsistence sector. It gives no regard as to when the work was done. The approach of "active population" is a more suitable definition for the labour force in the Sudan and similar newly developing countries.(27) This is because the majority of those in the labour force are self-employed or family workers in agricultural

activities. The method adopted in the Sudan in measuring the size of the labour force is by deducting from the total working age population (five years and above) the economically inactive groups such as students and housewives.

According to the 1955-56 census, about 37 per cent of the total population was engaged mainly in economic activities, such as agriculture, industry, services, etc. Of the persons above five years of age, 59.8 per cent were economically active (46.2 per cent with economic activity as main occupation and 13.6 per cent with economic activity as subsidiary occupation), and 40.2 per cent were not economically active.

Since 1955-56 census, three sample surveys[28], which give some information on labour force, have been conducted in provinces of the north. The position revealed by these surveys as well as by the 1955-56 census is shown in table 4.5.

The figures from different sample surveys are not strictly comparable. The census of agriculture figures in particular, cannot be used as the definitions of "working" and "non-working" farm population were not spelt out. In the case of females, the overall percentage of working farm population was very high mainly because of the Darfour and Kordofan provinces where the percentages of working population were 62 and 51 respectively. The Household Sample Survey conducted in 1967-68 was more scientific though it related to only six provinces in the north and covered only the settled population. If the results of this survey are compared with those of the population census, it will be seen that the

Table 4.5

Estimates of Labour Force

	In Labour Force %			Outside Labour Force %		
	M	F	T	M	F	T
1. Population Census 1955-56[1]						
Children						
(1) 5 years to puberty	52.3	7.0	31.9	47.7	93.0	68.1
(2) Adults past puberty	96.5	9.4	51.9	3.5	90.6	48.1
(3) Total 5 years and over	82.5	8.8	40.6	17.5	91.2	59.4
(4) Total population	66.4	6.9	37.1	33.6	93.1	62.9
2. Population and Housing Survey (1964-66)[2]	52.5	5.3	30.1	47.5	94.7	68.9
3. Census of Agriculture (1965-66[3]	60.2	43.9	52.2	39.8	56.1	47.8
4. Household Sample Survey (1967-68)[4]						
(1) Urban Areas	45.5	6.1	26.2	54.5	93.9	73.7
(2) Semi-Urban Areas	47.8	6.3	26.8	52.2	93.7	73.2
(3) Rural Areas	50.2	10.5	30.0	49.8	89.5	69.9
(4) All Areas	49.3	9.6	29.3	50.7	90.4	70.7

(1) 1955 Census, (2) This covered 82 centres in the then six northern provinces, (3) Covered rural areas in the then six northern provinces and classified the population between "working" and "non-working".

participation rates of males had declined consideraly in 1967-68 possibly because of rapid increase in educational facilities. On the other hand because of higher education and enlightenment, female participation rates had gone up appreciably. The difference in both cases is, however, quite marked and perhaps cannot be entirely justified by the growth of education. The 1967-68 results

seem, therefore, underestimates in the case of males and somewhat overestimates for women.

4.5.5 Industrial Relations and Labour Legislation. Until the early 1970's, industrial relations in the Sudan have been patterned after the British model. During the British colonial administration minimal interference was imposed by the government and legal requirements for establishing a trade union were uncomplicated and easily met[29]. In consequence, a few small and relatively weak trade unions emerged. The Sudan Railway Workers Union, however, was an exception to this rule. It originated in 1946, a full decade prior to the National Independence. In 1949 the National Workers Congress was formed as a federation of existing trade unions, and in 1950 this Congress became the Sudan Workers Trade Union Federation. Its history became bound up with the nationalist struggle for independence.

The 1958 military government dissolved all trade unions; but in 1964, following the restoration of democratic life, the trade union movement became a significant factor in the Sudan. There was substantial growth in union membership over the next decade and by 1971, there were 546 registered trade unions with a total membership of 281,607. The majority of these unions, however, were too weak, and most of the unions had a small membership (less than 200). The larger unions were confined to the public sector.

In 1967 the Sudan Employers Consultative Association was formed. It is primarily concerned with labour relations but its role is not to negotiate with trade unions on behalf of its affiliates, but

rather to provide advisory and consultant services for its members.

During the first 15 years of independence, collective bargaining played little part in regulating the terms of employment in the Sudan. In the public sector conditions and terms of employment were unilaterally determined by the government; and these served as a ceiling, or as a pattern for conditions and terms of employment in the private sector. The beginning of the early 1970's, may be considered a dividing line in the field of industrial relations in the Sudan. The 1949 Trade Unions Ordinance was replaced by the 1971 Trade Unions Act. This legislation restructured the trade unions into 38 blue-collar and 48 white-collar unions. These unions are structured along sectoral, industrial or occupational groupings. In 1973, the Minister of Public Service and Administration Reform produced regulations specifying the sectors in which unions might be formed. Paralleling this development on the trade union side, the organization of employers was restructured by the Employers Organization Act of 1973. In pursuance of this Act, regulations were issued prescribing one employer organization for each of several specific producing sectors. These sectoral organizations are to become affiliated to a national employers' federation. Organized labour and management have become integrated into the unitary political organization of the country, the Sudan Socialist Union (SSU). The SSU has been reconstituted with five major secretariats representing farmers, workers, employers and merchants, professional employees and the armed forces. The new framework provides wide scope for developing a system of tripartism between government, trade unions, and employers.

The Minister of Labour is empowered to prescribe the industrial sectors in which workers' and employers' organizations may be formed. As a result inter-union rivalry and jurisdictional disputes are no longer causes for industrial unrest in the Sudan. Employers have to deal with recognized trade unions. The removal of such conflict areas from the industrial relations scene should serve to enhance a climate of industrial peace in the Sudan. In fact, strikes in recent years have been rare, in part due to the Presidential Order of 1969, which prohibits strikes. Other factors tending to minimize the likelihood of strikes include the framework for negotiation provided by the Trade Disputes Act of 1966. The Act makes it mandatory on parties to a dispute "to enter into friendly negotiation for the settlement of that dispute within a period not exceeding three weeks", and any agreement arrived at becomes legally binding on the parties. In case of failure to reach agreement, either party has the right to request that the commissioner of labour mediate the dispute. If mediation fails, the matter is referable to arbitration by the Commissioner of Labour provided both parties to the dispute so agree. In cases where a work stoppage is likely to have serious negative social and economic effects, consent of the parties affected is not mandatory, for arbitration. This procedure for dispute settlement has so far worked effectively to minimize industrial conflicts in the Sudan.

4.6 Summary

The Sudan is the largest country in Africa in area, and one of the least developed. According to United Nations publications, the Sudan is considered among the hard-core least developed countries.

The criteria adopted relate to per capita income, literacy and the relative share of the manufacturing sector in total output. The country came under the condominium rule (British and Edyptian) in 1899. Complete political independence was attained in 1956. Since then, the country witnessed a variety of political systems. Between 1956 and 1969 parliamentary instability resulted in two military coups. The first was between 1958-1964; and the second in May 1969, which brought the present regime to power.

The country includes a range of climates from tropical forests in the south (average rainfall 1,500mm), an extensive savanna in the west, to semi-desert and then desert in the north. The total area of the Sudan is one million square miles, of which one third is classified as suitable for agriculture but only one tenth of this area is at present under cultivation.

With an average of slightly less than six persons per square kilometre, the Sudan has a low population density which is unevenly distributed. Distribution of population is generally associated with water sources. Consequently, the bulk of the population is concentrated along the Nile and its tributaries and also in Central Sudan. Estimates based on the provisional results of 1973 census indicate the population growth during the period 1955/56 - 1972/73 has been around 2.2 per cent. However, Khartoum, Blue Nile and Kassala provinces experienced the highest rates. The country is lightly unurbanized, but the degree of urban growth reached in certain towns has been sufficient to bring the problems which accompany rapid urganization. Often population shift from rural to urban areas may result in a mere transplantation of poverty from rural into urban centres. The drift

to these centres has been activated by the push factors, as population pressur, lack of job opportunities, lack of rain for good crops and pull factors such as higher annual earnings, job availability, education, and the low costs of migration due to the extended family system in the Sudan. All in all, the causes of urban-rural movements are both economic and social.

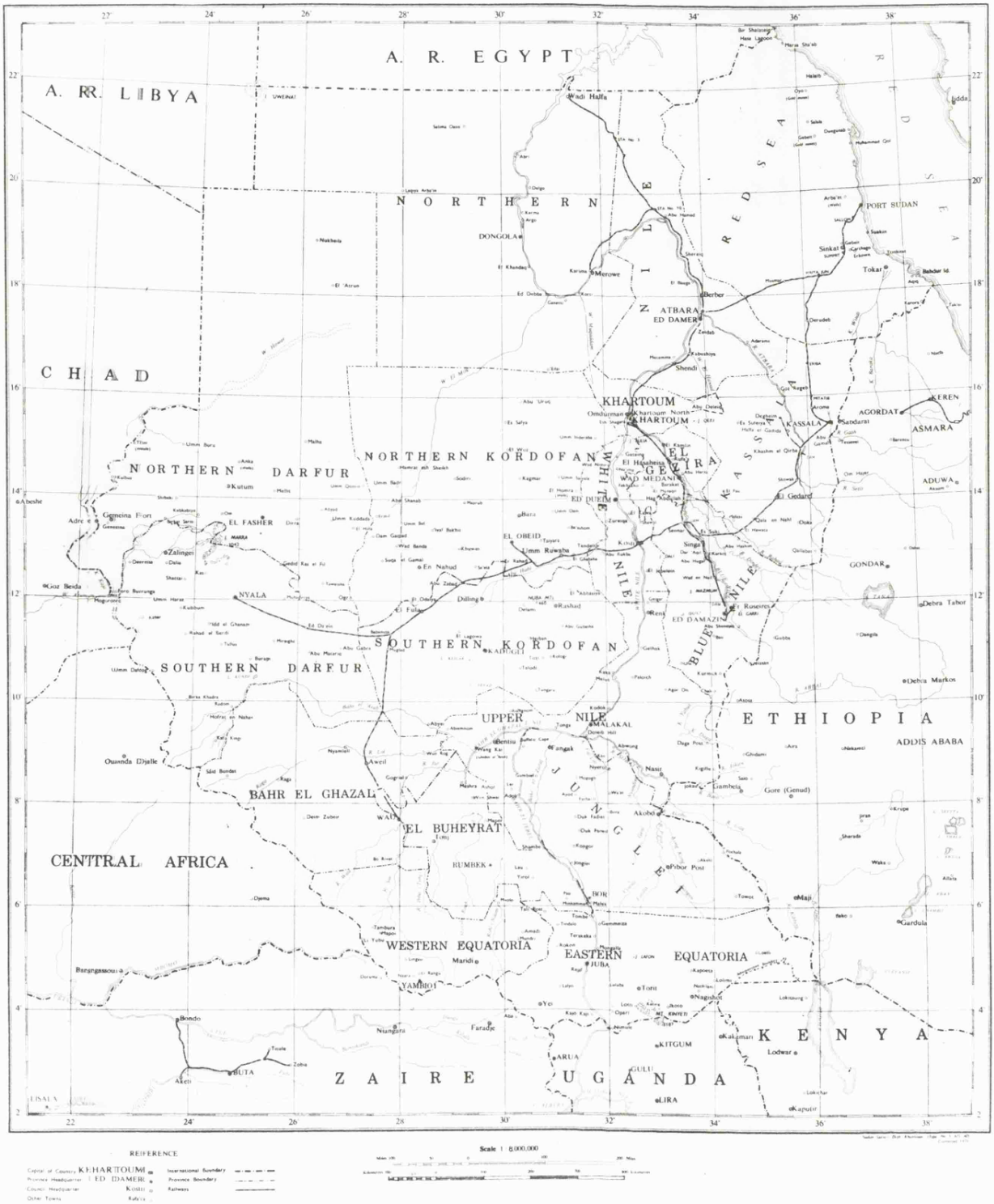
Maps Section

AFRICA

4.1

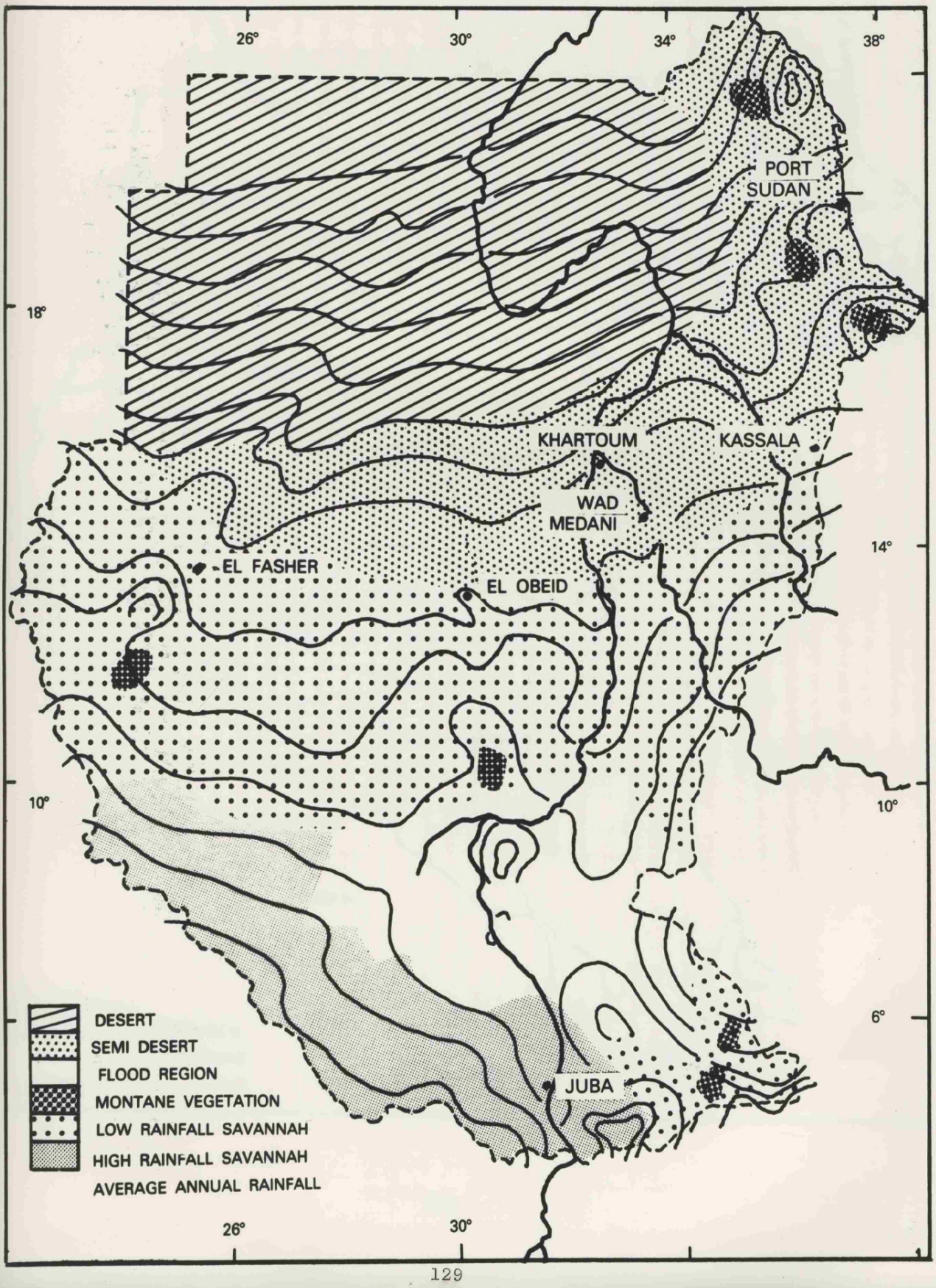

MEDITERRANEAN SEA
Iran
Iraq
Libya
Egypt
RED SEA
Saudi Arabia
Yemen
Southern Yemen
Chad
Sudan
Ethiopia
Somali Republic
Central Africa
Kenya
Congo Kinshasa
Zaire
ATLANTIC OCEAN
INDIAN OCEAN

SUDAN

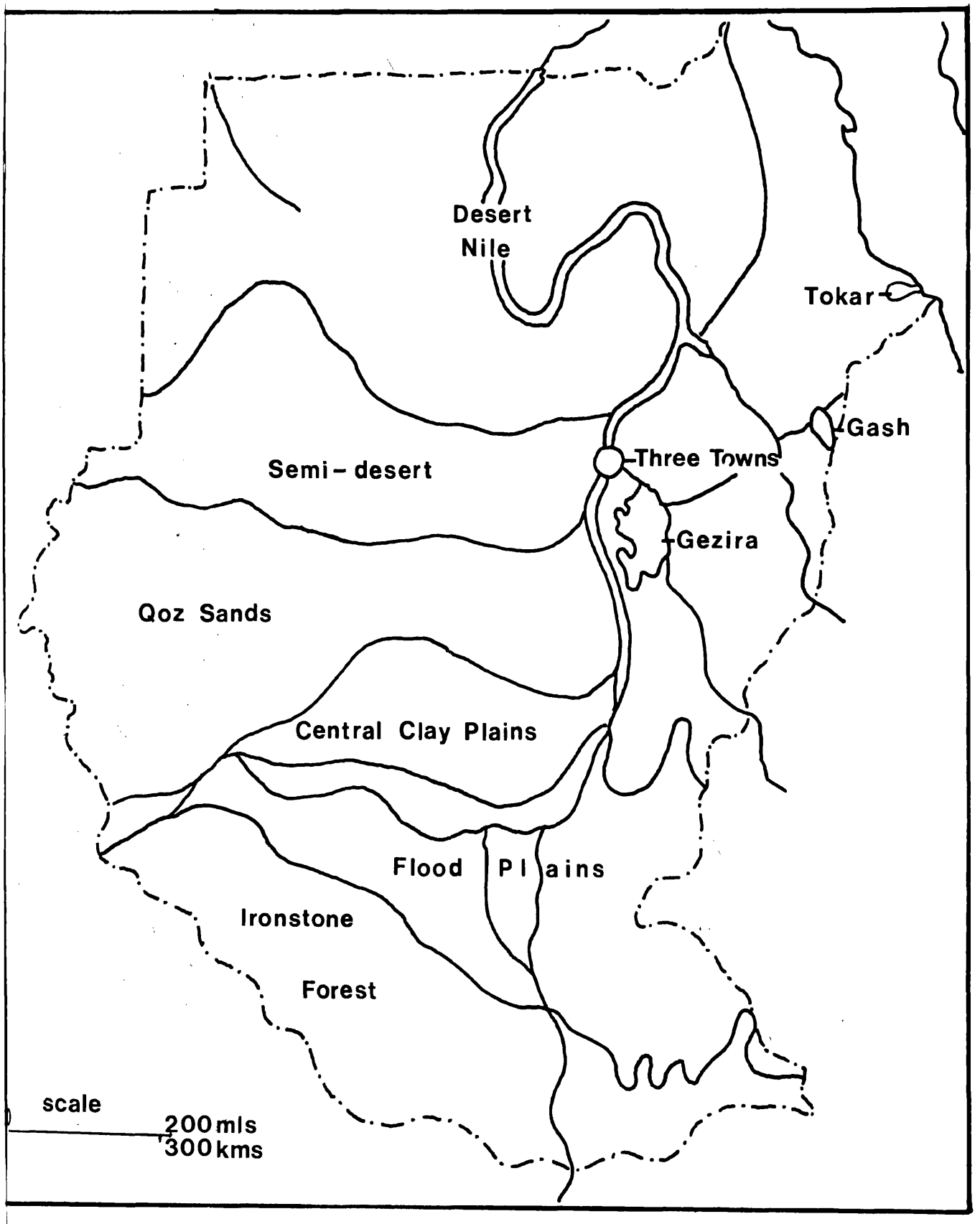

A. R. EGYPT
A. RR. LIBYA
CHAD
CENTRAL AFRICA
ZAIRE
UGANDA
KENYA
ETHIOPIA
NORTHERN
NORTHERN DARFUR
NORTHERN KORDOFAN
KHARTOUM
EL GEZIRA
SOUTHERN KORDOFAN
SOUTHERN DARFUR
BAHR EL GHAZAL
UPPER NILE
EL BUHEYRAT
WESTERN EQUATORIA
EASTERN EQUATORIA
ATBARA
ED DAMER
RED SEA HILLS
BLUE NILE
WHITE NILE
JUNGLEI
ASSUA
KASSALA
PORT SUDAN
KHARTOUM
OMDURMAN
WAD MEDANI
EL OBEID
NYALA
EL FASHER
KUTUM
DONGOLA
MEROWE
BERBER
SHENDI
SINKAT
TOKAR
AGORDAT
ASMARA
KEREN
ADUWA
GONDAR
DEBRA TABOR
DEBRA MARKOS
ADDIS ABABA
GORE (GENUD)
MALAKAL
JUBA
MARIDI
YAMBIO
TORIT
KAPOETA
KITGUM
LODWAR
LIRA
ARUA
GULU
RUMBEK
BOR
NASIR
AKOBO
GARDULA
MAJI
WAKA
ABESHE
ADRE
GOZ BEIDA
ZALINGEI
EN NAHUD
ED DAMAZIN
RENK
SINGA
KADUGLI
DILLING
RASHAD
UMM RUWABA
ED DUEIM
KOSTI
WAU
TAMBURA
BANGASSOU
BONDO
FARADJE
NIANGARA
ZOBIA
AKETI
BUTA
LUSAKA
REFERENCE
Capital of Country KHARTOUM
Province Headquarter ED DAMER
Council Headquarter KOSTI
Other Towns
International Boundary
Province Boundary
Railways
Scale 1 : 8,000,000

VEGETATION REGIONS AND RAINFALL

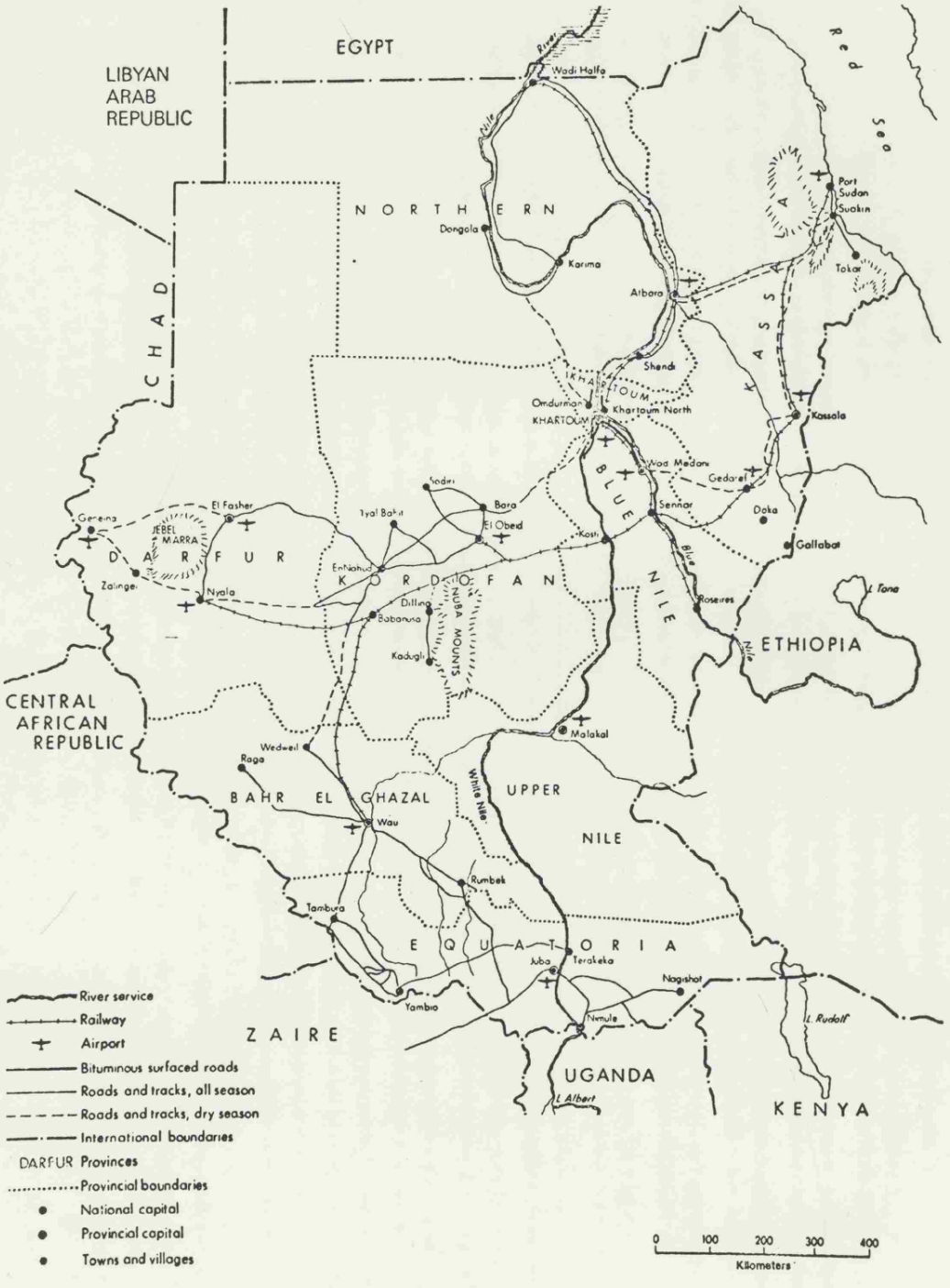
4.3



SUDAN : ECONOMIC REGIONS



The Sudan : Main lines of communication



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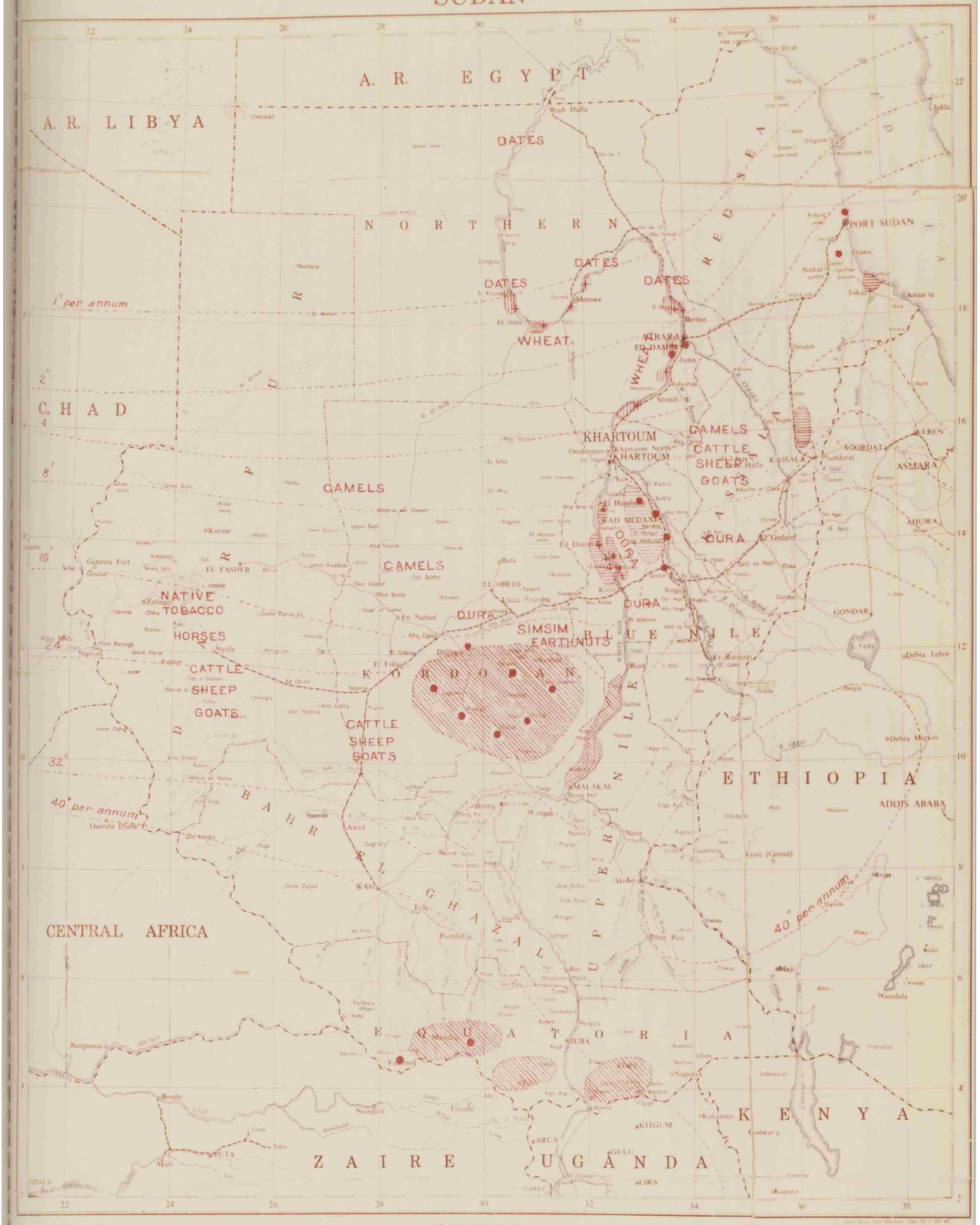
PRINCIPAL AGRICULTURAL PRODUCTS OF

SUDAN



CHAPTER FIVE

CHAPTER FIVE

THE ECONOMY: A GENERAL REVIEW

5.1 Introduction

Sudan is a newly developing country. It is one of the 25 least developed countries.(1) 79.9 per cent of Sudan's population are engaged in agriculture and pastoral activities.(2) According to the provisional estimates of the 1973 Census, more than 80 per cent of the total population are settled in rural areas. The distinction between the modern and traditional sectors hinges on methods and conditions of production, scale of economic activity, and extent to which monetary incentives influence economic activities. In fact, a large part of the population engaged in traditional agricultural activities, and relies on hand-operated irrigation methods or scarce rainfall. By contrast, the modern sector has adopted power-operated or gravity-flow methods of irrigation and the use of mechanical implements.

The transport system is a major constraint on both current operation and future development of the country. The railway system is a single track network which enjoyed a near monopoly of inland transportation. The road network is very limited, as road construction and improvement had, for a long time a low priority. River transport plays a minor role in the movement of freight and

passenger traffic. Air transport system is not playing an important role as it should have been for a vast country like Sudan.

The government has played an increasingly important role in economic development and in the expansion of new areas of employment and income-yielding opportunities. Private savings are very scarce and hence the government has assumed responsibility in investing in infrastructure, agriculture and industry.

The progress of formal education has been impressive in the Sudan since independence in 1956. Though the Sudan is one of the 25 least developed countries, it ranked the second among these countries in number of students in higher education.(3)

The great change in the economy was brought about by the introduction of modern irrigation schemes. In fact, exploitation of land resources through more modern means has channelled significant private capital and managerial resources into agriculture. This pattern of modernization in agriculture has led to strong geographic concentration. More than 90 per cent of the irrigated land is in Kassala and the former Blue Nile Provinces; Khartoum is close to these rich farm areas, and most of the industrialization has taken place in the capital and neighbouring areas. Elsewhere, apart from scattered development projects, the effects of modernization have barely been felt. Thus one outstanding feature of the structure of Sudan's economy is a marked geographic dualism. Moreover, provision of public services such as education, health, etc, has also been concentrated in the higher-income areas, thereby accentuating the

disparity. While much of the literature on dualism in less developed countries points to the modern sector as producing for export and the traditional sector producing for subsistence, this distinction is not strictly applicable to the Sudan. Most crops grown by the Gezira tenants (except for cotton) are for subsistence. Nevertheless, the Gezira has been a core of the modern sector. Another case in point is that gum arabic, a major export product, is produced in rural areas.

Although the long-term development potential of the Sudan is unquestionably enormous, it cannot be denied that the country faces several important but hopefully temporary economic problems. A decrease in the area under cotton cultivation, combined with flooding and excessive weed growth, contributed to an estimated decline of over 50 per cent in cotton production in the 1975/76 Season. The effect of this shortfall in production on the balance of payments has been mitigated due to sales of the large volume of carry-over stocks of cotton from previous years. However, foreign payments difficulties will be exacerbated by the high level of external debt incurred recently with shorter average maturities. This could all result in a strain on the Sudan's debt servicing capacity in the next year or two. Although a good cotton crop materialized in 1976/77, the Sudan would probably need balance of payments support in the near term. Given the interest shown by wealthy Arab nations in the Sudan's development, however, it is anticipated that the Sudan is likely to receive assistance needed to overcome any possible crisis in external payment.

5.2 Gross Domestic Product

It is worth mentioning at the outset that the unified national accounts system adopted by the Arab League States derives its basic structure from the United Nations' latest system of National Accounts, the main objectives of which are:-

1. To direct the various departments of statistics to improve and develop the basic statistical programmes which are necessary for aggregating economic data related to national accounts.

2. To present a detailed and comprehensive base for concepts and definitions related to national accounts, as well as for other relevant classification necessary for the collection and tabulation of basic statistics.

3. To provide the basic data for international reports concerning national accounts.

The Sudan, being a member of the Arab League adopted the System in 1966/67.(4) Table 5.1 below gives G.D.P. for 1956, 61, 66. Over this period, Sudan's G.D.P. grew at an annual rate of 5 per cent.

Table No 5.1(5)

Growth of G.D.P. at Factor Cost

Year	1956	1961	1966
G.D.P. (LSM)	299.4	376.2	456.9

Table 5.2 below shows that Sudan was among ten African countries of G.D.P. exceeding $1,000m. But if we consider the G.D.P. per capita for the countries mentioned in table (5.1) we shall find Sudan experienced the lowest growth of product per head.(7)

Table No 5.2(6)

G.D.P. at 1970 Market Prices - Selected African Countries 1960-1970

(in million U.S. dollars)

Country	G.D.P. in 1960	G.D.P. in 1970	Percentage change 1960-1970
Nigeria	5,184.6	7,438.8	43.4
Egypt	4,367.1	7,295.3	67.0
Morocco	2,249.8	3,351.8	48.9
Ghana	1,915.1	2,519.6	31.5
Ethiopia	1,096.6	1,836.0	67.4
Kenya	763.5	1,617.8	111.1
Uganda	578.5	1,304,2	111.1
Tanzania	670.6	1,281.0	91.0
Gambia	30.4	46.1	51.6
Sudan	1,376.4	1,831.1	33.0

Table (5.3) gives a breakdown by economic sector of Sudan's G.D.P. As may be seen from the table, the agricultural sector dominates the economy accounting for about 40 per cent of G.D.P.(8) The high rate of contribution of the agricultural sector to G.D.P. is due to the greater attention paid to it by the State which has led to its development, particularly in its modern aspects. The importance of this sector is even greater when one considers that agricultural products represent over 95 per cent of Sudan's export revenues, and provide the raw material for most domestic industries.

Crop output has increased through intensified cultivation under

Table 5.3(9)

Gross Domestic Product by Economic Activity at Current Market Prices 1971 to 1977

Kind of Activity	1971/72		1972/73		1973/74		1974/75		1975/76*		1976/77*	
	LSM	%	LSM	%	LSM	%	LSM	%	LSM	%	LSM	%
Agriculture	324.1	39.0	344.6	38.4	516.4	41.4	585.3	38.5	691.8	38.9	817.7	39.1
Commerce, Finance and Services	284.1	34.1	313.3	34.9	411.5	33.0	518.5	34.3	608.7	34.3	714.6	34.2
Industry and Mining	76.8	9.2	82.9	9.2	111.3	8.9	142.9	9.1	167.2	9.4	195.6	9.4
Transportation and Communication	51.3	6.2	61.5	6.9	74.8	6.00	89.4	6.2	100.4	5.7	112.7	5.4
Construction	26.4	3.2	31.2	2.0	61.0	4.9	65.0	3.8	81.8	4.6	123.0	4.9
Electricity and Water	16.9	2.0	17.5	2.0	18.6	1.5	20.9	2.2	21.9	1.2	23.0	1.1
Custom Duties	52.8	6.3	45.8	5.0	52.6	4.2	8818	5.9	105.1	5.9	124.4	5.9
G.D.P. TOTAL	832.4	100.0	896.8	100.0	1246.2	100.0	1510.8	100.0	1776.9	100.0	2091.0	100.0

*Estimates based on an average rate of growth in each sector during the period 1969/70 - 1974/75

government sponsored irrigation schemes, and through expansion of mechanized farming by the private sector on rainfed lands. Output in the livestock sector has been attributed to an increase in veterinary services (primarily associated with establishment by government of a disease-free zone in north eastern Sudan and cattle routes in the western part of the country), as well as private investments in ranching and cattle fattening projects.

The table also provides evidence of slow growth through the low contribution of the transport sector to the G.D.P. This is attributed to the inadequacy of infrastructure. However, G.D.P. statistics do not clearly depict the increasing importance being given by government to development of the transportation sector, particularly as regards the construction of roads.

The sector for commerce finance and services is the second largest one in terms of contribution to to G.D.P. benefitting primarily from the growth in external trade. Its estimated contribution to G.D.P. in 1977 is 34.2 per cent. Industry and mining had a relatively constant share of G.D.P. (nearly 10 per cent) but many large new projects particularly in sugar production and textiles should increase its share in the near future. Government policy has been to encourage investment in industry at a rate which has enabled it to increase its output rapidly and remarkably. However, there are some problems (e.g. inadequate use of capacity, non-viable industrial enterprises, etc.) which should be solved through devising the most effective policies and plans for future industrial development. Electricity and water has had the lowest contribution to the G.D.P. ranging from 2.2 per cent in 1971 to 1.1 per cent in 1977. However, PEWC has

not upgraded its organization to undertake the nationwide functions for which it became responsible in 1970.

Although there is at present no overall G.D.P. index of prices in the Sudan, an indication of the inflation rate may be obtained from the index of prices for lower income civil servants in Khartoum area.(11)

A detailed break-down of gross domestic expenditure (see Table 5.4) indicates that private final consumption accounted for the major share of the increase in G.D.P. Its share of Gross Domestic Product increased from 70 per cent in 1972/73 to 78 per cent in 1974/75. Gross fixed capital formation also showed a large growth, though from a smaller base. Its share of G.D.P. increased from 11 per cent to 14 per cent of G.D.P. over 1972/73 - 1974/75, indicating a greater commitment of resources to development in Sudan. Recent increases in the level of gross fixed capital formation in the Sudan have occurred due to three main reasons:-

(1) Growing commitment by government to preparation of development projects.

(2) Major increases in external financing provided for development projects, and

(3) Important development activity by the foreign and domestic private sector in response to greater encouragement by government.

2.3 Foreign Capital

Sudan has very small foreign exchange reserves of its own to finance

Table No 5.4[12]

Gross Domestic Expenditure in Current Prices

1972/73 to 1974 /75 (Amounts in £s million)

Expenditure Category	1972/73		1973/74		1974/75		1972/73 1974/75
	Amount	%	Amount	%	Amount	%	% growth
Government final consumption expenditure	166	19	181	15	208	14	25
Private final consumption expenditure	632	70	861	69	1171	78	85
Increase in stocks	10	1	89	7	51	3	410
Gross fixed capital formation	95	11	140	11	214	14	125
Exports of goods and services	145	16	171	14	171	11	18
less: Imports of goods and services	(151)	(17)	(196)	(16)	(304)	(20)	101
TOTAL	897	100	1246	100	1511	100	68

imports. External reserves have been fully utilized in financing imports. Development has taken place largely through unprecedented levels of commitment of external financial support from the Arab community, international development banks and other lenders. These sources of financial support have become increasingly aware of the Sudan's enormous development potential and the efforts being made by government to prepare viable development projects.[13]

Statistics provided by the Bank of Sudan depict the evolution of net foreign capital inflows to the public sector (in £s million). Table (5.5) shows that major transfers of resources have been taking place, particularly in the past two years from rich Arab countries to Sudan. Arab governments and Arab international organizations have

Table No 5.5[14]

Net Foreign Capital Inflows to the Public Sector (in £s millions)

Net flows to government from:	70/71	71/72	72/73	73/74	74/75	75/76
Arab countries	1.4	4.3	7.8	12.7	73.5	78.7
Other International Organizations	1.5	-	0.8	3.8	32.0	12.2
Western countries	(4.2)	4.1	(4.3)	3.8	11.8	(1.6)
Eastern bloc countries	2.0	(0.8)	(0.3)	(0.7)	(1.6)	(6.3)
Other	(1.0)	(2.7)	-	2.2	12.3	6.5
Subtotal	(0.3)	4.9	4.0	21.8	128.0	89.5
Trade payment agreements (net)	8.9	14.0	(13.5)	2.0	3.1	1.3
Flows to Banking System (net)	13.1	(10.5)	15.2	10.1	20.5	17.5
Net public inflow	21.7	8.4	5.7	33.9	151.6	100.5

increased their net dispursements to Sudan from £1.4 million in 1970/71 to £78.7 million in 1975/76. A major increase occurred in 1974/75 when net inflows totalled £73.5 million versus only £12.7 million in 1973/74, indicating the importance of the rise in oil revenues that year.

The political grounds for the massive new commitments of official assistance to Sudan from its neighbouring Arab countries are not difficult to guess. Oil rich countries are increasingly looking to Sudan as the potential break-basket of the Arab world. These countries must now import virtually all of their food requirements. One long-term solution to render the Arab world self-sufficient in

food requirements is through investment of oil revenues in the production of foodstuffs in a friendly Arab country such as the Sudan.

5.4 Transport

Transport difficulties in the Sudan date back to prehistory. Professor M Shibieka states that:-

> "Looking at the map of the Nile Valley ignoring the cataracts and the desert conditions coming almost to the edge of the river in the Northern Sudan, one is tempted to speak of one unified region with the great river as a permanent and sure means of communication ..... yet it is the part of the Nile Valley between Berber and Aswan that had the great effect on the history of this country more particularly its contact with the Mediterranean civilizations. There are five cataracts in this area between Aswan and Berber with Batn el Hagar (Belly of the Rocks) between the 2nd and 3rd as a series of rocks and water obstacles. In the latter area (Batn el Hagar) difficulty of communication extends to the land even with efficient motor transport ..... it is the natural barrier to easy communication with Egypt that frustrated the alleged invastion of Cambyses. The Potolmics had had their contacts but they never took an interest in those wretched territories difficult to reach. Nero, the famous Roman emperor, sent two centurions to explore the Sudan. It is stated they reported back that the country was too poor to merit

incorporating in the empire. I maintain that it was not the poverty of the country only, but mainly the difficulties of communication that made them report unfavourably on the Sudan. Though they were great builders of roads, yet the Sudan defeated them in this respect."(15)

The Sudan remained without being touched by invaders until "it was only when some nomad Arabs trekked southwards seeking for better pastures and living space and freedom from payment of taxes specially to those non-Arab rulers who succeeded in Egypt ..... . They had their means of transport (the camels); their sheep and goats, their tents and house equipment to take on the trek. It was in this way through centuries that the Arabs spread over the Sudan until they were stopped by the Sudd region in the South, where the change of nature was more than they could adjust their life to. The Arab Muslim penetration into Sudan particularly in the Central regions was the great influence on the history of this country. It has stamped what we now call the Northern Sudan with the Arab-Muslim Cultural civilization. This could not be achieved were it not for the single fact that the nomadic Arabs were particularly fitted for surmounting difficulties of communication of Sudan with Egypt."(16)

Mohamed Ali of Egypt tried to annexe Sudan and hence he suggested in 1837 that a track be laid from the iron ore deposits of Kordofan in Western Sudan to the Nile. This first railway had to await the decision of another ruler, the Khedive Ismail of Egypt. In 1885, the year that Khartoum fell before the Mahdi's religious followers,

the line was driven on to Akasha. It was too late to save General Gordon because of "nature and transport" besides "difference in morale."[17] To ensure communications, supply and retreat lines for Kitchener, the railhead advanced first to Kerma, and then further south to Abu Hamad. By 1898, it reached the Atbra river. The town of Atbra has since become the headquarters of Sudan Railways.

By 1912 the railway was extended to Khartoum, Sennar, Elobeid and PortSudan. During the First World War, rail construction came to a halt. Building started again in the twenties when the Haiya-Kassala line was opened. The line was continued to Gadaref in 1928. By 1957 the next major decision was taken to convert wholly to diesel, the first diesel arrived in 1960. In the 1960s the major parts of Sudan were connected by a railway system which extends over 4757 kilometres, one of the longest in Africa. It has enjoyed a near monopoly of inland transportation, specially on the vital PortSudan Khartoum route where it handles about 76 per cent of freight traffic and 71 per cent of passenger traffic. This route is of vital importance to the Sudan, for the country depends on substantial imports of fuel, food, fertilizers and other consumer and capital goods as well as exports (cotton, gum arabic and oil seeds) most of which pass through PortSudan.

Other modes of transport are: (a) The pipeline which was completed in 1977. It is now used in transporting oil products between PortSudan and Khartoum. (b) Road transport system which received in recent years considerable attention from the public as well as private sector in spite of the unsatisfactory road conditions between supply and demand points. (c) A third mode is the river

transport system which is of unique importance in providing bulk freight and passenger traffic between Kosti and Juba due to the absence of alternative transport facilities. (d) The air transport system.

5.5 Agriculture

Agriculture[18] is the dominant sector of the Sudanese economy and is likely to remain so for the foreseeable future. It currently contributes about 40 per cent of the country's Gross Domestic Product and accounts for over 95 per cent of export revenues. The income of about 80 per cent of the population is dependent on agriculture. In addition, agriculture supplies nearly all of the raw materials for Sudanese industries.

The agricultural sector is composed of two parts, the modern and the traditional. In the modern part, modern technology and means of production are used, such as modern irrigation means, tractors, insecticides and fertilizers. Cotton, wheat and oil seeds are the main outputs of the modern part. In the traditional part, old traditional means of production are used and consequently labour productivity is low. The characteristics of the traditional sector has been summarized by the Under Secretary of the Ministry of Finance and Economics to the Conference on Agricultural Development in the Sudan held in December 1965 as follows:-

> "1. The subsistence farmer is very conservative. He and his family are so close to subsistence level that they cannot afford to experiment with new crops or new farming practices.

2. The traditional farmer measures income, work and leisure on a scale different from that which the economist is accustommed to finding in non-agricultural societies.

3. Through trial and error, subsistence farmers have often worked out a harmony with the environment which is acceptable to them and their tribe or village and therefore the individual sees no advantage in change.

4. Because most traditional societies are generally remote from urban centres, they are isolated from communications and from free exchange of ideas.

5. The traditional farmer lacks knowledge of the economic value of seed selection, proper seed preparation, time of planting, planting rates, fertilizers and other modern agricultural techniques."

The main products of the traditional sector are sorghum, millet, and oilseeds, such as sesame and groundnuts. In 1960/61, three quarters of the agricultural products were produced in the traditional part, while one-quarter was produced in the modern part.

In 1955/56 livestock, forestry, fishing and marine products contributed 19 per cent, 16 per cent and 4 per cent of the total value of agricultural production respectively. Farming activities contributed about 61 per cent. A basic constraint on agricultural

production is availability of water. For this reason expansion of agricultural production has taken place along the Nile, its main tributaries, and in the regions of the Sudan endowed with adequate rainfall. This situation has been well described by Sayed Mirghani Hamza, a former Minister of Irrigation and Hydro-Electric Power, as follows:-

> "The Sudan is a vast country ..... . But as a whole, it is a dry and thirsty one. Only in less than one-fifth of its area can its farmers rely on a rainfall of 30 ins. in three years out of four. In the northern part the rainfall averages less than 6", and only by artificial irrigation is agriculture possible at all. Even in the Central zone, the rains are so variable and unreliable that at least supplementary irrigation is necessary to mature most types of crops. Much of the most important supply of water for irrigation must always be the River Nile as it flows through the country."(19)

5.5.1 Structure of Agriculture. Farming sector represented about 60 per cent of agricultural total contribution to G.D.P. in 1971/72. Within this sector the proportionate value of output of crops in that same year is shown in Table 5.6.

As can be seen from Table 5.6, Cotton and Sorghum are Sudan's two main crops, accounting for about half of total output from farming. Cotton and oil seeds in general have in the past accounted for nearly all of the output of cash crops, or nearly half of total farm output. However, these cropping patterns are now undergoing rapid change. In line with the government goals of self-sufficiency in

Table No 5.6[20]

Farming Sector 1971-72

Proportionate Value of Output of Crops

Food crops	% of total	
Dura (Sorghum)	25	
Dukhn (Millet)	5	
Wheat	3	
Maize	2	
Fruits	7	
Vegetables	5	
Fodder and others	6	
Subtotal		53
Cash crops		
Cotton	32	
Sesame	8	
Groundnuts	6	
Sugar cane	1	
		47
TOTAL		100

basic foodstuffs and diversification of exports, the production of foodgrains and oil seeds have all expanded rapidly while cotton output has declined as shown in Table 5.7.

The decline in cotton production is overstated in Table 5.7 however, due to exceptionally poor cotton yields and a one-year decrease of

about 200,000 feddans in area under cotton in 1975/76. The significant increase in sorghum production resulted from its inclusion in rotations on organized schemes and in mechanized farming operations.

Table No 5.7[21]

Area and Production of Major Crops 1975/1976

Crop	Area		Production	
	Feddans (000)	% of 1971/72	M. Tons (000)	% of 71/72
Dura (Sorghum)	6,179	136	2,025	127
Dukhn (Millet)	2,512	120	403	91
Sesame	2,291	119	238	80
Groundnuts	2,066	137	931	240
Seed Cotton	989	81	323	47
Wheat	714	248	264	213
Maize	211	570	55	393
Castor	46	139	16	114
Sugar Cane	35*	113	1,148*	131
Rice	17	142	7	117

* Data are for 1973/74 rather than 1975/76

Abour four-fifths of the total area in Sudan is suitable for some agricultural use, including 218 million feddans of forests, 200 million feddans of cultivable land and 57 million feddans of pasture areas. While these figures are only rough estimates, they indicate the magnitude of the country's agricultural potential. Less than 10 per cent of the cultivable area or 17 million feddans, has yet been used for farming operations, of which about 4.5 million

feddans are under irrigation schemes. New projects planned or under implementation are expected to roughly double the current irrigated area by the early 1980's.

5.5.2 Agricultural Produce

(a) Cotton

The modern agricultural sector, the export earnings, the import of goods, government revenues, rail and road transport, internal trade, banking operations, employment in the non-agricultural sector - in fact, the whole economy - is dominated directly, or indirectly by the production of the cotton crop. Over 1.25 million feddans of cotton are cultivated annually, which amounts to over 55 per cent of the country's exports by value.(22) It also provides the main raw material for Sudan's developing textile industry. Sudanese cotton has traditionally been of the long stable Egyptian varieties, for which it is the second largest exporter in the world. In recent years, Sudan has been pursuing a policy of diversification of cotton varieties, and medium staple Acala cotton as well as short staple American cotton varieties are being introduced.(23)

Successive governments since independence gradually became aware of the dangers and risks involved in the dependence of the eocnomy on one crop, and the necessity of decreasing it. This problem has been pointed out in the Ten Year Plan which argued: "It is no less essential that the excessive reliance on a mono-culture crop, cotton has to be gradually reduced by diversifying the agricultural cropping pattern."(24)

(b) Groundnuts and Sesame

Groundnuts and sesame are the two main oil seed crops in the Sudan.[25] These crops are important both in terms of domestic consumption and exports. They represented 20 per cent and 7 per cent respectively of total export revenues during the first six months of 1976.[26]

An increasing proportion of the crops have been processed into oil, with the cake being incorporated into animal feedstuff. Production of groundnuts rose from 568 (M.Tons, 000) to 931 (M.Tons, 000) between 1972/73 and 75/76. Production of sesame, on the other hand, declined from 340 (M. Tons) to 238 (M.Tons) during the same period. This is due to problems of shattering on mechanized schemes.

(c) Wheat and rice

Wheat has had little significance in the past, but the shortage all over the world and the introduction of new varieties that can be grown in the Sudan, has encouraged its development. In line with the government's import substitution policy local production has increased from 152,000 metric tons in 1972/73 to 264,000 M.T. in 1975/76 for wheat and from 5,000 M.T. to 7,000 M.T. for rice, but they still account for 60 per cent of estimated domestic consumption. Their production is expected to increase dramatically to 860,000 M.T. for wheat and 60,000 M.T. for rice by 1985.[27]

(d) Gum Arabic

It is the fourth of the Sudan's foreign exchange earning crops.[28] Sudan produces over 70 per cent of the world's gum production. It contributed 6 per cent of total export revenues in 1975/76. Gum has

a wide use in confectionery, adhesives, cosmetics, explosives, pharmaceuticals, plastics, and other industries. Nearly all of Sudan's production takes place in the traditional sector. Production suffered considerably due to drought through 1973/74. Since 1974, gum production and exports have increased due to establishment of new government plantations, increase in export prices and minimum prices paid to farmers and efforts to curtail smuggling.

(e) Sorghum and Millet

Sorghum (dura) is the most important staple food in the country. Fluctuations in dura production lead to fluctuations in its prices. To stabilize prices, the Storage and Soils Corporation was formed.(29) Its aim is to assume the role of buyer in the season of abundancy; and during the period of the crop's scarcity to act as seller. Sorghum is followed by millet (dukhn). The area planted to millet has been fairly constant at somewhat more than 2.5 million feddans, while production varies from 259,000 to 450,000 metric tons. The area planted to sorghum has increased by 50 per cent between 1973/77 reaching 6.2 million feddans in 1976/77.

(f) Vegetables and fruits

A virtual self-sufficiency in vegetables exists as they have been grown successfully in various parts of the Sudan; with greater production Sudan could emerge as an exporter of fruit and vegetables. That could only be possible if the problems which hamper exports are solved, ie, high cost of transportation by air for small quantities of production and the limited availability of packaging materials.

5.5.3. Government Agricultural Policies. The Five Year Plan for economic and social development 1972/77 has spelled out the following objectives for the agricultural sector:

(1) To reach self-sufficiency in all imported agricultural commodities that can be produced locally, such as wheat, sugar, rice, tea and coffee.

(2) To realise a surplus of agricultural commodities for export and to diversify exports in order to reduce dependence on cotton.

(3) To promote mechanized rainfed farming and to expand the area of land under irrigation.

(4) To settle nomadic people and integrate them into the various agricultural schemes.

(5) To encourage private sector investments in development projects.

The Six Year Plan (1977/78 - 1982/83) is expected to further these same basic objectives. It considers agricultural development as the basis for developing the national economy as a whole.

The strategy aims at intensifying efforts upon vertical expansion alongside horizontal expansion as well as modernizing traditional agriculture and promoting rain-fed mechanized agriculture particularly in state farms.

In respect to animal production and fish resources, the strategy aims

at making available, and promoting veterinary services both preventive and medical; as well as establishing regional laboratories and health quarantines and constructing modern slaughter houses. As far as forestry is concerned, the strategy aims at afforestation and conservation as well as organizing forestry production.

To achieve these targets an estimated investment in agriculture of £715 million is expected over the Six Year Plan period, of which £425 million would be made by the public sector and £290 million by the private sector.

To encourage private investment in agriculture both by the Sudanese and from overseas the "Promotion of Agricultural Investment Act" was passed in 1976, complementing similar legislation which exists for industries and for services.

Aside from the promotion of Agricultural Investment Act, the government is sponsoring an important research effort in this sector, and provides important additional services to assist both the modern and the traditional private agricultural sectors. For major export crops, government corporations, undertake marketing and provide some stabilization of producer prices.

5.5.4 Livestock. Unfortunately there are no reliable estimates of livestock population. Official figures (Table 5.8) are completely theoretical estimates based on data such as livestock vaccination returns, taxation receipts and arbitrary bulking-up factors. However, since the main influence on the figure for any year is the trend in the previous year (which is also subjectively

determined by several years estimates) the basis of the original estimate is of interest in judging the validity of the above data. The original estimates have been made in 1925, again unfortunately without any objective census of animals, and consequently, the whole basis of present estimates is unsound and the data must be regarded with great caution.

Table 5.8[30]

Estimated Livestock Population of the Sudan 1970 (thousand head)

	Cattle	Sheep	Goats	Camels
Northern Provinces				
Darfour	4,030	2,250	1,500	600
Kordofan	1,700	2,250	1,250	950
Blue Nile	1,020	2,500	1,400	250
Kaasala	330	900	500	550
Northern	170	320	250	80
Khartoum	7	110	300	70
Sub total	7,257	8,330	5,200	2,500
Southern Provinces	4,743	1,670	1,800	-
TOTAL: Sudan	12,000	10,000	7,000	2,500

In spite of the above, Sudan has great potential for the development of livestock production for local consumption and exports. The principal constraints on the development of the livestock sector, particularly for the expansion of livestock exports, are considered to be:-

(a) The traditional nomadic production pattern which

leads to late maturity of the animals, low quality meat, and seasonality of supply.

(b) Long distances between producing areas and the main consumer centres or export points which gives rise to transport problems and intensifies the seasonality of supply.

(c) Lack of practical experience of modern methods of livestock production both in the public and private sector.

(d) Disease problems.

In the Six Year Plan 1977/78 - 1982/84 the government intends to establish seven major settlement areas for farming and ranching, including improved animal husbandry techniques. Assistance is being obtained from the World Bank, Britain, West Germany, and Abu Dhabi. The plans also aim at reducing mortality by intensifying curative and preventative measures against animal diseases and controlling infectious diseases. Other schemes in the plan are to provide corridors for migrating cattle and extra watering points to assist the essential nomadic movement.

5.6 Industry

Modern industry in the Sudan started only after the First World War. Even in 1956, manufacturing output amounted to only about 5 per cent of output; since then it has grown fairly rapidly and now accounts for about 10 per cent of the G.D.P. The expansion of industrial output has been as much the result of government policy as a natural accompaniment to development in other sectors

of the economy. Very considerable fiscal concessions have been made to encourage the establishment of industry in the private sector of the economy and the government has been active in promoting industrial concerns in public ownership. Before independence, which was the main spur, nearly all development schemes were financed only from Sudan government revenue. After it, the door was opened to an inflow of money from both eastern and western Europe, U.S.A., Arab countries, and the United Nations. Output doubled, and industrial investment was £11 million by 1961-62. By 1970 there were 209 registered factories in the Sudan. A lion's share of these is concentrated in the industrial area of Khartoum North which has 153 factories. In a paralelled development, the number of workers employed in manufacturing has grown rapidly. In 1956 there were 9505 workers employed in manufacturing. This figure expanded to 13,598 in 1960, and to 19,708 in 1962.(31) As can be seen in Table 5.9, 42,823 workers employed in manufacturing in 1971.(32)

Industrialization was initiated in the Sudan despite numerous obstacles and handicaps. These include the following:-

(a) inadequate infrastructure, including roads, electric power, and educational institutions;

(b) lack of large internal markets and low purchasing power;

(c) scarcity of capital, inadequate savings, and means of accumulation;

(d) lack of skilled and technically trained workers engaged in subsistence agriculture;

Table 5.9 (33)

Manufacturing Industry in the Sudan

Type of Industry	No of Establishment		Total production		No of labourers		Wages		Total invested capital	
	No	%	£000	%	No	%	£000	%	£000	%
Food, drinks and tobacco	82	34.2	40.029	48.8	15,195	35.5	4,428	34.2	40.864	39.8
Spinning, weaving, ready-made clothing and leather	32	15.3	18,991	23.2	15,787	36.9	4,867	37.6	34,382	33.5
Wood products	8	3.8	322	0.4	604	1.4	121	0.9	718	0.7
Paper, paper products, printing	12	5.7	2,880	3.5	2,291	5.3	613	4.7	4,469	4.4
Chemicals	25	16.8	9,998	11.6	3,767	8.8	1,222	9.4	10,397	10.1
Non-metallic products	12	5.7	3,520	3.0	1,763	4.1	570	4.4	8,166	8.0
Metallic products	1	0.5	730	1.0	78	0.2	61	0.5	392	0.4
Machinery and equipment	36	12.5	6,658	8.4	3,303	7.7	1,057	8.2	3,282	3.2
Other	1	0.5	64	0.1	35	0.1	8	0.1	34	-
TOTAL	209	100.0	81,892	100.0	42,823	100.0	12,947	100.0	102,704	100.0

(e) over-concentration of the economy on cotton growing, and cotton-export revenues;

(f) widespread application of inefficient methods of production using primitive technology and rooted in a subsistence sector.

Despite these obstacles to the development of industry, the Sudan possesses immense potential and resources. These include favourable possibilities for developing import substitute branches of industry. Moreover, there are several favourable locations for future development of hydroelectric power production. Contrary to the popular belief, Sudanese industries are not all small scale. The information contained in Table 5.9 indicates that the average number of workers per establishment in each of the industry sectors represented range from 35-300. A handful of establishments are of good size, even by United States standards. For example, "The Sudan Cotton Textiles Company" (owned by Gulf International), located in Khartoum, employs over 8,000 workers, spread over three shifts a day.

Government concern with promotion of industry started immediately after going politically independent. However, the field was left wide open for the private sector. The national government, recognizing the importance of industrialization and realizing the many factors that tend to retard it, formerly declared its policy of encouraging private capital in the industrial field.(34) The Industrial Bank of Sudan was established in 1961 to advance sums to industrialists, extending management and technical advice, and co-operating with appropriate government institutions to further industrial development.(35)

Another area in which the government initiated efforts to promote industrial development is in vocational training. Vocational centres were set up to train workers in all areas of development.

5.6.1 Performance of Industrial Units

Industries established in the Sudan have for the most part been appropriate for the early stages of industrialization. The industrial mix is similar to that of other countries at the same stage of evolution in being concentrated on food processing and textiles.

(a) Sugar

Sugar production in the Sudan started in 1962 with the establishment of the "Guneid" Sugar Project, and at a later stage "Kashm El Girba" started operation in 1966. Though the two factories did not suffice the increasing local requirements, expansion in sugar production was withheld primarily because of the low world sugar prices and the high cost of production at home. The maximum production capacity of each project was estimated to be 60,000 tons anually, "Guneid" was producing up to 1971 20-30 thousand tons. The low productivity and the high cost of production at Guneid is attributed to the tenancy system practiced in that project.

In 1971 the government policy made a new turn to produce enough sugar to suffice house requirements. To attain this, production of about 1.5 million tons of sugar is envisaged by the end of 1985. The Five-Year Plan allocated £241.1 for the following projects: (1) North West Sennar, (2) Asalaya, (3) Kenana, (4) Melut,

(5) Extension of Khashm El Girba.

These projects could also open up interesting possibilities for the development of associated products. Molasses produced from existing sugar operations are not utilized; the large-scale of production in future would allow the production of yeast for bakery and pharmaceutical use, of gin, rum and of ingredients for balanced animal fodder, or might permit the establishment of a chemical complex.

Unfortunately, most of the sugar projects experienced delays in execution. The reasons for these delays are mainly inadequacy in basic infrastructure, liquidity problems in both domestic and foreign currencies and, finally, the difficulties faced by contractors due to the shortage of skilled labour and equipment.

(b) The Oil Seeds Industry

This is the oldest food industry in the Sudan and the biggest in terms of production value. Exports of oil products, including oil and oil-cake during the period 1970-74 represent 6.4% of the country's total exports and are considered the only exported industrial product. Further investment is planned to process other types of seeds and improve machinery and methods in order to increase the percentage of oil that is extracted.

At present, there exist in the country 79 mills, working at a capacity of 875 thousand tons per annum and new licences have been granted to establish another 90 factories for the production of 540 thousand tons per annum.

(c) Fruit and Vegetable Canning

In addition to the factories already existing in Wau, Karima, Khartoum North and Kassala, five licences have been granted to establish new factories in this field.

The food industry has proved to be less efficient than was hoped. "Kassala onion dehydration" is a good example; its production capacity was estimated to be 900 tons, but its actual production was 17, 19 and 54 tons for 1972, 1973 and 1974 respectively. The main reason was that supplies have not been sufficiently well assured to keep the plant running at full capacity.

(d) Textiles

Those who have been closely observing the international situation of the textile industry in the last three decades must have noticed the remarkable shift in the location of the machinery away from the old established centres of the industry to newly developing countries. Sudan was no exception to this general rule. Sudan Textile Industry Ltd and Khartoum Spinning and Weaving Co., are the first two pioneering factories in this field. They were located in Khartoum area for various social and economic considerations. The area was preferred particularly because of its proximity to the river and the railway facilities, and the availability of large areas of level ground on which the factories would be established. Factors such as the existence of a settled and an enlightened labour force which possessed a certain degree of manual dexterity, were also taken into consideration.

The situation now is that the textile industry is established, and while it still operates on the basis of a protected domestic market, at least the foundations for further developments have been laid and it ought to be able increasingly to provide for domestic consumption. The amended Five Year Plan (1972-1977) included many new projects for textiles, in an attempt to develop this sub-sector. Some of these projects, such as the Hasa-Heissa Friendship Textile, which aimed at the production of 14 million metres of popular cloth have already been finished. Other textiles projects such as Shendi, Nyala, and Kosti, with a capacity of 9.2 million metres each are expected to commence production towards the end of 1977, and Kadugli, Dueim, Mongalla, with the same capacity, in the first half of 1978.

These developments are part of a plan designed to make Sudan independent of imports of textiles with processing capacity capable of manufacturing 27,000 tons of cotton (about 13 per cent of the local crop). There are further plans to extend capacity with a view to exporting yarn and subsequent cloth.

Cotton is not the only home produced textile material that it is intended to use in manufacturing. A factory for the manufacturing of Kenaf at Abu Na'am has been built and work has begun on another one at Tong.

(e) Leather Industries

Another example of the use of domestic materials in manufacturing is that of leather. The first modern establishment for processing hides was set up in World War II. This was followed by the establish-

ment of a tannery by the government in Khartoum which is to be supplemented by another in the same locality, and by others in "WadMedani" and "PortSudan". The production of shoes seems very suitable for the Sudan, but raw material supplies, including leather as well as synthetics have been inadequate and the production record at the Bata nationalised corporation has been poor. There are also a number of small tanneries in the private sector.

(f) Other Industries

By comparison with industries based on domestic materials, other types of manufacturing are of less numerical importance. Chemicals, plastics and petroleum are relatively highly represented, the most important single unit being the refinery at "PortSudan". There are opportunities for extensions to other types of chemical processing, but it seems that they are limited at the present time by availability of raw materials or markets.

The engineering industry is still in an embryonic state. A number of engineering products are manufactured. Similar considerations apply to the building materials industry, where there is both the need and the opportunity to increase the output of cement, bricks, etc, which will be needed rapidly as development proceeds.

5.7 Public Finance

In this section government revenue and expenditure are analysed. The fundamental problem here is using the fiscal system on both the expenditure and revenue sides to capture real resources for the purpose of development and use them in top priority investment

projects.[36] The government, in this context, gets the maximum possible revenue at the least cost and spends it to maximize the output of the economy.

5.7.1 The Budget.[37] Table (5.10) shows the overall financial operations of the public sector for the fiscal years 1975/76 and 1976/77 in millions of Sudanese pounds.

Table 5.10 [38]

Public Sector Operations 1975/76 - 1976/77

		1975/76		1976/77
Central Government Revenue	332.0		338.4	
Central Government Expenditure	303.2		351.2	
Surplus (+) or deficit (-)		+28.8		+37.2
Development Expenditure		-113.1		-216.4
Public Entities' Position surplus (+)/deficit (-)		-12.3		-3.0
Other Public Sector Operations		-33.7		+12.7
Public sector's overall deficit		-130.3		-169.5
Financing of the deficit		130.3		169.5
External Loans (Net)	22.5		9.9	
Loans from the Banking System	107.8		159.6	

It appears from Table (5.10) the overall public sector's deficit increased by £39.2 million to £169.5 million during 1976/77. The

striking feature of 1976/77 budget was the increased reliance on the banking system to finance the budget deficit which had even more expansionary effect on the money supply than was the case in 1975/76.

It is shown in the above Table that the ordinary budget surplus increased by £8.4 million during 1976/77 to stand at £37.3 million. Development expenditure on the other hand showed a substantial increase of £103.3 million to £216.4 million.

The resultant overall deficit was financed from internal resources to the extent of £159.6 million of which £158.3 million represented the central government net indebtedness to the banking system, while the balance of £9.9 million was financed from external resources. This exhibited more central government's dependence on deficit financing from the Central Bank.

(a) Central Government Expenditure

Table (5.11) shows the budgetary proposals for 1977/78 ordinary expenditure which amounted to £489.4 million; compared with estimates of £378.0 million for 1976/77. The fall of £11.8 million in 1976/77 actual expenditure under Chapter I was attributed in part to the fall in General Administration expenses to the extent of £4.7 million while the balance was the result of the reduction on part of the various ministries and government departments of expenditure under this Chapter. On the other hand, actual expenditure under Chapter II dropped by £14.2 million. This was more than accounted for by the fall of £20.7 million in General Administration expenses which covers the servicing and repayments of

Table 5.11[39]

Ordinary Expenditure (£ million) 1976/77 - 1977/78

	1976/77		1977/78
	Estimates	Actual	Estimates
Chapter I	61.8	50.00	71.5
Chapter II	312.2	298.0	413.9
First part of Chapter III	4.0	3.2	4.0
	378.0	351.2	489.4

foreign and domestic debts.

As regards the estimates of the ordinary expenditure for the fiscal year 1977/78, appropriations for Chapter I showed an increase of £21.5 million over the 1976/77 actuals. This was caused by the upward adjustments of the salaries of some employees in the Public Sector and the creation of new jobs. Chapter II estimates expenditure was increased by £115.9 million to £413.9 million due partly to the increase of £67.6 million in the General Administration expenses and partly to the central government transfers to peoples' local government councils which are estimated to rise from £72.5 million in 1976/77 million to £90.0 million in 1977/78.

(b) Revenue

Table 5.12 shows the main components of the estimated revenue for 1977/78 compared with the estimated and actual figures for 1976/77. Direct and indirect taxation are the basic components of the central government's revenue constituting about 12 per cent and 60 per cent

Table 5.12[40]

Revenue Estimates 1976/77 - 1977/78 (£ millions)

Revenue Components	1976/77 Estimates	1976/77 Actual	1977/78 Estimates
Import duties	105.6	109.8	107.8
Agricultural, industrial corporations	37.3	12.3	51.3
Duties on goods and services	58.3	35.4	65.1
Excise tax	56.8	43.6	54.9
Consolidated Income Tax	37.6	41.7	47.7
Export duties	12.0	11.8	14.0
Profits from sugar monopoly	37.0	41.0	28.0
Consumption tax duties	11.2	13.0	16.0
Development tax	23.1	28.8	37.7
Reimbursement and interdepartmental services	12.4	12.2	14.9
Profits from the banking system	6.5	8.7	6.7
Interest and dividends	7.7	2.3	10.0
Pensions	5.1	3.2	14.2
Stamp duties	3.0	2.1	2.5
Export royalties	1.1	0.8	1.3
Fines	1.2	0.9	1.6
Others	32.4	20.8	79.0
TOTAL	448.3	388.4	552.7

respectively of actual revenue. Direct taxes include taxes on business profits, personal income, estate, capital gains and

stamps. Indirect taxes include import, export, excise duties, royalties and exchange taxes.

Import duties showed an increase of £4.2 million over their estimates despite the drop in actual imports as revealed by the foreign exchange budget import estimates. The Table also reveals a drop of £25.0 million in the contribution of public corporations which was due to the drop of £13.7 million in the local counterpart of the loans in kind and the low profitability of some public corporations.

The increase in consumption of sugar during 1976/77 due to the fall in retail prices may explain the rise of £4.0 million in profits from the sugar monopoly. The increase of £5.7 million in development tax revenue was attributed to the rise in the development tax rate from 3 per cent to 5 per cent in January 1977.

5.8 Banking and Credit

Up to 1960, the banking system in the Sudan consisted of commercial banks with the Ministry of Finance administering foreign exchange and watching the value of money.(41) The National Bank of Egypt served as a lender of the last resort. Other active banks were Barclays Bank (1913), Ottoman Bank (1949), Bank Misr (1953), and the Commercial Bank of Ethiopia (1958).

The Bank of Sudan was established in 1960 to succeed the Sudan Currency Board and to take over the assets of the National Bank of Egypt. The capital of the Bank of Sudan is provided wholly by the government. As indicated by the Bank of Sudan Act 1959,

amended in 1976, the principal objectives of the Bank are to regulate the issue of notes and coins, to assist the development and maintenance of a sound monetary policy, to maintain the stability of the currency, and to serve as banker and financial adviser to the government.

In 1970 the government nationalized the commercial banks, in order to develop and improve the banking facilities throughout the country and to give the Bank of Sudan and the government full control over the monetary policy. The shares of the specialized banks (the agricultural bank, the real estate bank, the industrial bank) became wholly owned by the government.

By 1974, the whole of the banking system consisted of 103 branches, nine branches belong to Central Bank of Sudan, 21 branches of the specialized banks and the rest are branches of commercial banks.(42) Since 1974 onwards, the government policy has been to attract capital into the Sudan to help the development of the country. This has been done through different incentive acts, and through the opening of the banking sector to foreign banks. During 1975, the Board of Directors of the Bank of Sudan approved, with the consent of the Ministry of Finance and National Economy, the establishment of representative offices for Arab African Bank, Chase Manhattan Bank, and Bank of Credit and Commerce S.A. In 1976, National Bank of Abu Dhabi, City Bank, and Faisal Islamic Bank were authorized to open branches in the Sudan.

The deposits of the commercial banks amounted to £171.9 million in 1975 against £141.4 million in 1974 and £105.8 million in 1973,

which represents an increase of 62.3 per cent in 1975 over 1973. Total advances from the commercial banks to the private sector amounted to £186.1 million in 1975 against £123.2 million in 1974 and £98.8 million in 1973 which represents an increase of 88.4 per cent in 1975 over 1973. By the end of June 1975 the amount of money supply totalled £276.5 million.

Table (5.13) shows the growth of the supply of money in the Sudan in recent years. The Table depicts the rapid growth in money supply.

Table 5.13[44]

Money Supply, in £ million 1972-1976

	31/12/72	31/12/73	31/12/74	13/12/75	31/12/76
I Money A + B	137.7	168.5	219.7	251.6	310.8
A: Currency in circulation	75.2	92.8	118.7	128.7	152.8
B: Demand deposits	62.5	75.7	101.0	122.9	158.0
II Quasi money	27.7	35.4	46.8	57.9	69.7
TOTAL I + II	165.4	203.9	266.5	309.5	380.5

Currency circulation and demand deposits increased by 124 per cent over the period 1972-1976. Currency in circulation has dropped from 51.2 per cent to 49.2 per cent of the total money supply, and demand deposits have risen correspondingly from 48.9 per cent to 50.8 per cent. These changes indicate an improvement in banking awareness and progress in credit transactions, taking into

consideration that quasi-money has shown a similar increase, from £27.7 million in 1972 to £69.7 million in 1976, a percentage increase of 151.6 per cent.

5.9 Summary

Following political independence in 1956, the national government inherited from half a century of colonial administration a thin economic foundation. The socio-political evolution of the Sudan has left it with a highly centralized political and administrative system. The government bureaucracy, in all its forms, is very large and heavily engaged in both managing the economy and protecting itself.

The future development is, of course, conditioned by what has happened in the past, and plans to increase output need to be seen in relation to what it has been possible to accomplish so far.

The very size of the country and the low population density have hampered development of a comprehensive infrastructure and this, in turn, has inhibited economic growth. More than 80 per cent of the country's population lives in the rural areas and is directly or indirectly dependent upon agriculture and related rural activities for its livelihood. However, agricultural development is constrained by lack of water over wide areas of the country. As a result, population and economic activity are heavily concentrated along the Nile Valleys and the middle rainfall belt. Industries and commercial services are even more concentrated. Therefore, we can conclude that there is an urgent need to widen the impact of economic development

and to create improved means of livelihood for the rapidly growing population within the rural sector.

Although substantial mineral deposits have been identified, including recently, indications of oil, these are unlikely to be developed until the country's basic infrastructure has been substantially improved. In spite of large scale investments now being made to improve roads and railways, for the foreseeable future the country's development strategy will continue to place its prime emphasis on agriculture. The success of this policy will be dependent upon the provision of improved rural infrastructure and services and the establishment of institutions capable of delivering effective technical and financial support to rural projects.

At present, industry contributes about 10 per cent of the total G.D.P. and its development is closely linked to the agricultural sector. The major four projected growth industries for the future are (a) Sugar, (b) Textiles, (c) Vegetable Oil Milling, and (d) Construction. Recent industrial strategy has placed emphasis upon achieving self-sufficiency in essential manufactured goods and increasing the domestic value added on the country's primary products. The private sector is now playing a major role in industry and commerce, particularly in medium and small-scale enterprises many of which derive raw materials from agriculture or provide services to the rural sector.

Hanging over the development of the Sudan, affecting every aspect of production whether for export or domestic use and affecting the attraction of potential projects to outside investors, is the

inadequacy of the transport system. Unless something is done to overcome the transport bottleneck, the prospects of development in the Sudan are bleak indeed. The existing transport system not only retards development, it plays a dominant role in determining the pattern of development. An equitable and socially desirable pattern of development depends on creating and appropriate and adequate transport system. For many decades reliance has been placed on the railway as the sole mode of transport; river, road and air transport systems have been conceived of as adjuncts to the railway, never as modes of transport in their own right. Had the railway been originally designed as an instrument for development, this might not have been so serious. But the original function of the railway was administrative, and in the event the railway has determined the pattern and space of development rather than the reverse.

Another obstacle to development is the shortages of domestic resources. Although government current revenue has shown a rapid rate of growth, current expenditures have increased even faster. The result is a deficit which has not been covered by domestic savings and the government has turned more and more to deficit financing via sales of Bonds to the Bank of Sudan.

The Sudan is comparatively well-endowed with educated manpower although in certain technical disciplines there are still major bottlenecks. The growth of educational facilities has continued fairly rapidly during the 1970's particularly in expanding the availability of primary education and in establishing new regional universities specializing in technical and natural resource studies.

Finally, the country has embarked upon an ambitious development programme designed to develop its great natural potential, principally by means of large-scale capital investment and the application of modern technology. The execution of major capital projects is pre-empting most of the country's scarce resources of manpower, imposing heavy strains on existing infrastructure and the balance of payments and giving rise to serious management problems.

CHAPTER SIX

CHAPTER SIX

ELEMENTS OF INDUSTRIAL LOCATION

6.1 Introduction

We have already shown that developing countries exhibit wide diversities due to cultural, economic, social and political factors. However, in most of these countries industries tend to over-concentrate in few urban centres, with very little industry in rural areas. In India, for example, concentration of industries in Bombay and Calcutta, due to the uncontrolled liberty enjoyed by industrialists in selecting locations, caused a large influx of the population from the rural areas, consequently causing social problems and pressing very heavily on amenities to an extent hitherto not known.

"These centres with 12 per cent of the total urban population accounted for 63 per cent of the total workers. ..... The lopsided industrial growth had adversely influenced income distribution and the relative standards of living of the people in different parts of the country. In particular, it has introduced wide disparity of income between the industrialized areas and the underdeveloped regions."(1)

The industrial concentration in the southern part of Brazil is another case in point. In Zambia, regional disparty is such that 63 per cent of the provinces contributed only 11 per cent of the

gross domestic product[2]. Uganda, faced with the same problem, recognized that "industrial development is confined to a narrow area of the country ..... and that the state of development of Karamoja district compared to other areas is so low that it calls for emergency action."[3]

In this connexion, it is worth mentioning that developed countries are no exception; however the nature of the problem is different. Structural changes in the economies, involving the rise of some industries and the decline of others, as well as changes in the techniques of production, skills, habits and preferences, have altered the location requirements of modern industries and hence have caused high levels of unemployment in the older industrial regions. Regional disequilibrium, and the social problems accompanying it, have encouraged the governments of the developed countries to take remedial action, mainly directed towards solving the above problems.

Likewise, developing countries started to recognize the importance of industrial decentralization and regional balance, although this does not necessarily mean that circumstances in all developing countries justify such policies. To illustrate the point, the government of Pakistan in its second Five-Year Plan 1960-65, instead of emphasizing the need for establishing industries in remote areas, encouraged industries in places suitable from an economic point of view, where "transport systems, water and power resources and availability of raw material and potential markets offer suitable opportunities."[4]

Locational Pattern:- The locational pattern in the Sudan is not

different from the above. The urban centres in the Sudan, which lie within the Central Sudan and the Nile Corridor[5], are the areas where most of the industries are found. Nearly 50 per cent of the factories in the Sudan are engaged in processing of agricultural raw materials (food and non-food processing and fabrication). Some of the food industries are urban oriented industries. Khartoum province accounts for about 89 per cent of the factories in the bakery industry and 82 per cent of the confectionary processing. It also accounts for 75 per cent of factories engaged in the production of soft drinks. One of the two tobacco processing factories is also located at Khartoum, the other at WadMedani. All sugar factories, 66 per cent of the grain mills and 80 per cent of the canning factories, which are all part of the agricultural food industries, are located out near the sources of raw material production (outside Khartoum) due to the nature of the raw material (either bulky or perishable).

As regards non-food agro-industries, we once again find Khartoum province accounts for 65 per cent of the factories of these industries. The rest of the country accounts for 35 per cent. For non-agricultural industries, Khartoum province's share is more than 85 per cent. The most important industries in this group which are located outside Khartoum are the cement industry - in Atabra and Rubak, and the only petroleum refinery and car assemply plant at PortSudan.

The most important four industrial centres in the country are Khartoum North, Khartoum, Atbra and Omdurman. It goes without saying that the first, second and fourth towns comprise the province

of Khartoum. In this connexion, development of modern large-scale industry has taken place in Khartoum province which accounts for about two-thirds of employment and about half of the investment in this sector. 73.2 per cent of the manufacturing establishments in the country are located in Khartoum province as shown in table 6-1. Second to Khartoum is the Gezira province where a large number of cotton ginning factories and sugar and tobacco factories are located. Kassala province is the third, with a sugar factory, petrol refinery, a car assembly factory, some oil-mills and onion dehydrating factories. The latter two provinces have each received more than 20 per cent of total investment, albeit that this has given rise to less employment than in Khartoum. It is also clear from table 6-1 that the rest of the provinces enjoy the least share of industrial development. Some of the reasons given by officials are transport problems, unavailability of labour, power and markets in these regions.

All types of manufacturing are represented in Khartoum North, which contains 34.4 per cent of the national employment in food processing, 58 per cent of agricultural non-food employees. Within this latter group, 59 per cent of the national employment in textiles are in Khartoum North. Moreover, this industrial centre accounts for 59 per cent of the national employment in non-agricultural manufacturing (table 6-2).

According to the statistics, Khartoum is the second most important industrial centre, with 15 per cent of the national employment in food processing. Within this group 82 per cent of the employment in soft drinks is found and 44 per cent of confectionary factories are located. The town leads the service sector with 25 per cent of the

Table 6-1

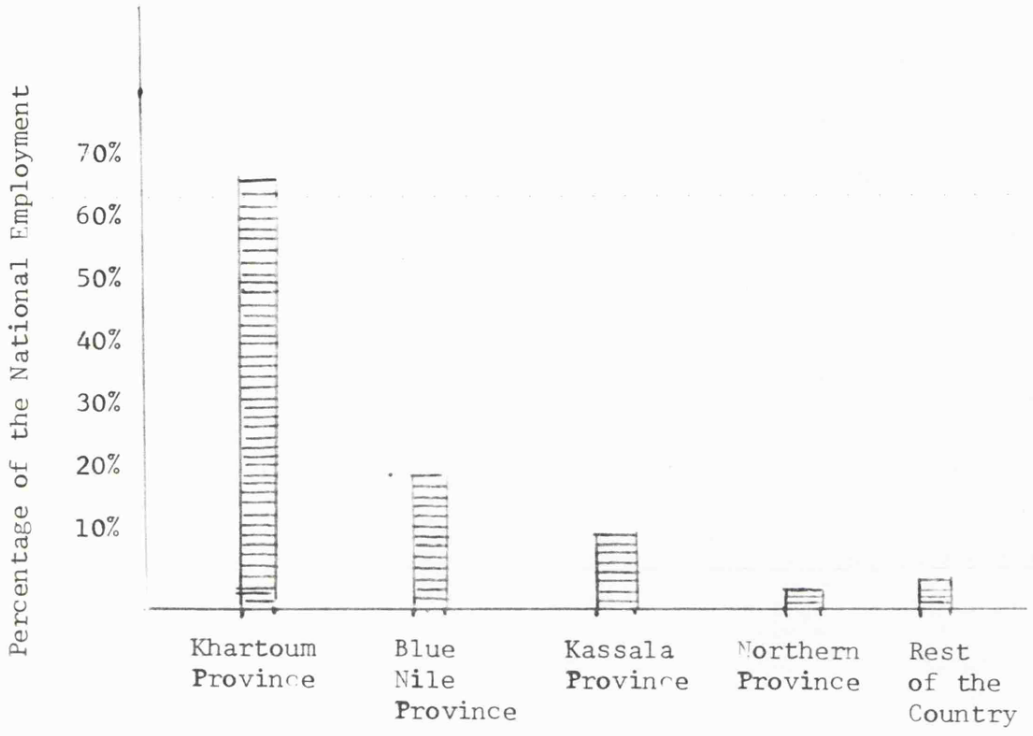
Dispersion of Manufacturing Industry in the Sudan

Province	Establishments		Value of Production		Workers		Total Wages		Total capital invested	
	No	%	Ls.M	%	No	%	Ls.m	%	Ls.M	%
Khartoum	153	73	54.1	66.1	27658	64.6	8.7	67.2	48.6	47.2
Blue Nile	18	8.6	13.3	16.3	8541	19.9	1.9	14.3	24.9	24.3
Kassala	8	6.2	10.4	12.7	4174	9.7	1.7	13.0	20.8	20.4
Northern	5	2.4	2.2	2.6	1140	2.7	0.4	2.9	4.7	4.4
Kordofan	16	7.7	1.4	1.7	928	2.2	0.2	1.6	2.7	2.6
Darfour	3	1.4	6.2	0.2	130	0.3	0.01	0.1	0.2	0.2
Bahar El Ghazal	1	6.5	0.4	0.4	263	0.6	0.1	0.9	0.9	0.9
TOTAL	209	100.0	81.9	100.0	42823	100.0	12.2	100.0	102.7	100.0

Source: Ministry of Industry. Khartoum. Sudan.

Figure 6-1

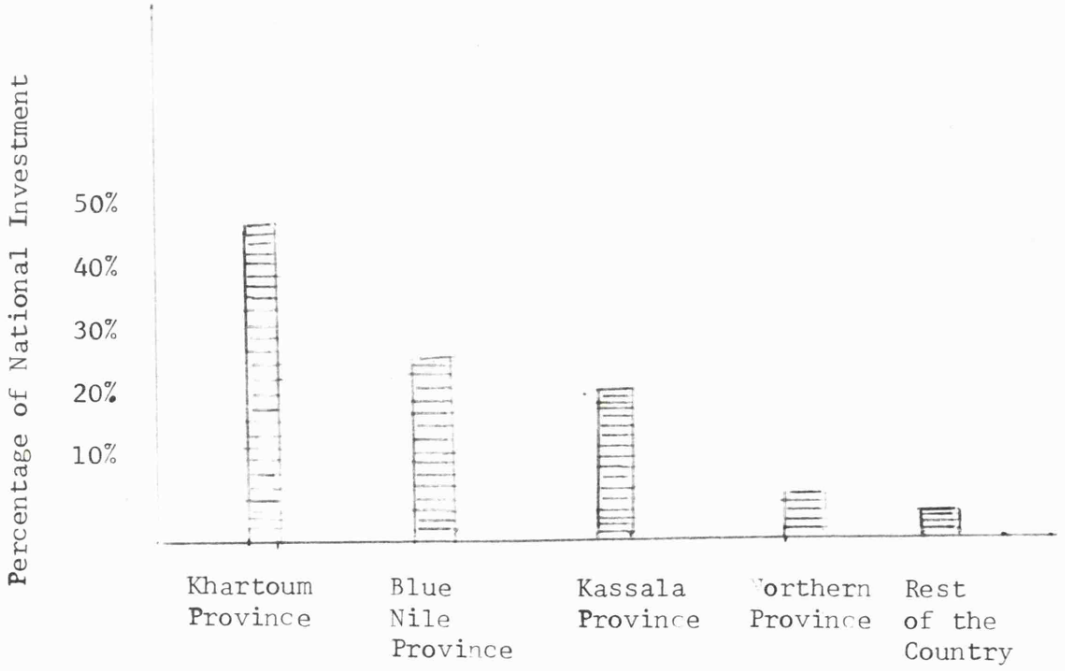
Employment Concentration



Source: Worked out of table 6-1

Figure 6-2

Investment Concentration



Source: Worked out of table 6-1

Table 6-2

Concentration of Industrial Employment by Types of Industries

INDUSTRIES	Industrial Employment (1) Khartoum North %	(2) Khartoum %	(3) Atbra %	(4) Omdurman %	Khartoum Province % (1 + 2 + 4)	Rest of the country %	Total %
(1) Agricultural Food Processing Industries	34.4	15	NA*	9	58.4	41.6	100
(2) Agricultural non-food industries	58	4	NA*	2	64	36	100
(3) Non-agricultural manufacturning and fabrication	59	10.4	5.2	15.8	85.2	9.6	100
(4) Service industry	12	25	21	0.3	27.3	51.7**	100

Source: Data compiled by the author from different sources during the survey.

*Less than 0.1%

** Scattered in 40 towns and villages

national employment in this sector. This because Khartoum is considered the leading centre in printing and publishing, small scale car and machinery repair and water processing and electricity generation.

Atbra is the third centre in terms of industrial employment. It differs from Khartoum North and Khartoum in the sense that the majority of its industrial employees are engaged in service industry rather than in manufacturing. Employment in this sector represented 94 per cent of the total employment in manufacturing and service industry of the town. This stands to be 21 per cent of the national in service industry, and it ranked second after Khartoum. The centre receives all its supply of goods from Khartoum province. The only industries in the non-agricultural manufacturing sector are the cement and shoe manufacturing industries.

The fourth industrial centre is the city of Omdurman (the third city in Khartoum province). The majority of its industrial labour is engaged in food processing. The town accounts for nine per cent of the total national employment in food processing ranking the third after Khartoum North and Khartoum. As regards bakery industry, the town ranks the first and contains 50.5 per cent of the employees in the industry. It is the second in soft drinks, with 15 per cent of the employees and the third in confectionary production with another 15 per cent of the employment in this industry.

The importance of Omdurman as an industrial centre is further accentuated by the non-agricultural manufacturing as it ranks the second in the country after Khartoum North. It is also second in

the production of soap with 40 per cent of total employment and plastic products fabrication with 34 per cent of the employees.

Albeit Omdurman is the fourth industrial centre, its share of the service industry is only 0.3 per cent of the national employment. Khartoum is the centre with the lion's share of this sector.

It is difficult to rule out the presence of agricultural non-food manufacturing in Omdurman as there are some leather tanning and furniture fabrication plants. All in all, its industrial area is equipped with most facilities needed but future expansion seems to be very difficult as it is caught between the residential areas of the city and inconveniences and problems caused by the factories adjacent to residential areas are causing worries for the local authorities.

The previous argument lends support to the fact that industrial concentration in Khartoum province has caused social and economic problems and severe congestion of population. In the late Seventies the government recognized the need for comprehensive planning on a regional basis; that planning is not only about sectoral allocation of investment, but also should ensure that the distribution of economic activities to the different regions resulting from such investments develops in economically and socially desirable directions. This we intend to discuss in Chapter Seven. The next two Sections of this Chapter can be seen as an attempt to investigate two issues:-

(a) <u>The relevance of the location theories to the Sudan</u>. Our purpose

is not testing the existing theories or models of location, but rather understanding more the existing pattern of industrial location in the Sudan and finding points of similarity (if any) and departures when we apply these theories to the Sudanese situation.

(b) To identify the main determinants that influence locational decisions of firms. This will help us to determine the relationship between industrialization and spatial development. Indeed, the heart of any regional development policy involves influencing the investment location decision, and this requires finding the most efficient combination of the determinants affecting industrial location. In turn, it is equally crucial to devise effective policy to determine at what stage in the decision making process these factors are considered and assessed, and this we intend to discuss in Chapter Eight.

6.2 Relevance of Location Theories to the Sudan

Without wishing to repeat what we have already mentioned in Chapter Two, it is of great importance to give a very brief and broad summary to the location theory.

We have already argued that different approaches have been used in examining locational factors(6). Some dealt with the issue using the partial equilibrium model stressing the cost side of the optimum location(7). Needless to say, that Weber brought this issue to the forefront.

Another school of thought opted for a general equilibrium approach which tried to cater for variations in market conditions, technology,

uncertainty, etc.[8]

But both of the above approaches concentrated on the basic theme that "a businessman's principal concern in picking a production site is to select the one that will enable him to operate at the most profitable level of output."[9] Equilibrium will be attained as long as there are no imperfections in the human element in that decision makers are absolutely rational, there is perfect knowledge and there are no institutional rigidities. With these assumptions, the theory of location is seen as part of the general theory of profit maximization.

The above analysis suffers from basic limitations when applied to developing countries, and the Sudan in particular. For one, although developing countries are characterized by some similarities, (eg, duality of the economy, poverty, etc,) that make them more distinct than industrialized countries, they as well display differentiation and heterogeneity that make it very difficult to adopt a universal approach for the location of industry in all developing countries. The complexity of factors that are to be taken into account, makes it necessary that decision makers adopt varying patterns of industrial location that are in line with the particular circumstances, comparative advantages, stated objectives, and socio-economic systems of different countries.

In the Sudan, one cannot completely dispense with the traditional cost and demand factors, which indeed have influence on locational decisions; however, other economic and non-economic factors play crucial roles in influencing locational decisions. To push the

argument further, the least cost model which emphasizes the search for the least cost site, appears on the face of it, to explain the location of some industries in the Sudan - particularly material-oriented industries. However, an in-depth analysis of this model will reveal that it amounts to no more than a systematic consideration of all possible locations, calculating transportation and production costs at each location and selecting the lowest. This does not take into account the demand factors at different sites, economies of scale and the different possible pricing policies, and the role of the State in influencing the locational decisions.

The concept of 'maximum profit location' which specifies a site that can serve a given number of buyers at the lowest total cost is hard to find in a country like the Sudan. It excludes considerations of product differentiation, consumer preferences and most importantly, it abstracts from reality in the sense that businessmen settle for a satisfactory rather than maximum profit. Some of the entrepreneurs interviewed rejected profit maximization on ethical and religious grounds.

So, to visualize location of industry in the Sudan from the two angles of (a) cost minimization, or (b) profit maximization is too restrictive an approach, and less relevant to explain the situation in the Sudan. Perhaps one agrees with Eva Muller and James N Morgan, in arguing that "..... there is a purpose to going beyond factors bearing directly on costs and market access and to examine also some 'non pecuniary factors'."(10)

Non pecuniary factors have considerable influence in the locational

decision in Khartoum region. It is the area with the best quality of life. The kind of living conditions such as cinemas, clubs, good education, health service, cultural meetings, etc, are considered as important by the majority of managing directors interviewed. "To locate away from Khartoum means to be away from good life....." explained one of the respondents.

More interesting are the causal factors mentioned. Some businessmen argued that they have chosen Khartoum because it is the province where they belong. They feel safe and satisfied with the conditions at Khartoum. These criteria are applicable to enterprises owned and managed by owners.

Government projects are not immune from causal factors. Some of the decisions taken to locate government projects were purely unsystematic political decisions. No careful analysis was even made about costs or revenue or even the social benefits to emanate from the projects. Examples are Aroma Cardboard Factory and some of the textile factories which are ironically now under construction. These factories, instead of being a source of revenue, will be a burden on the tax-payers for years to come.

Another point of departure of the location theory and the realities of the industrial location in the Sudan is the assumption made by the former that information is perfect and available. This is certainly not true. As a matter of fact, one of the retarding factors of industrial development in Sudan is lack of information. Managers in Khartoum lack information and objective knowledge about conditions in the other provinces. This could explain the reluctance of the

of the private sector in the Sudan in having any interest in rural development. Their logic is realistic in keeping away from areas where investment advantages have not yet been proven.

In this connection, the concept of bounded nationality coined by Simon[11] is supported by the results of this study, for four reasons. Firstly, the locational objective is to have satisfactory returns rather than maximum profits. Secondly, the concept of the economic man - coined by profit maximizers describing the absolute rational decision matter - is rejected, as the decision maker acts within certain constraints. Thirdly, the decision maker's emphasis is on locations with proven advantages, usually in already industrialized areas rather than peripheral regions. The industrial concentration in Khartoum illustrates very clearly this point. Fourthly, the decision maker acts within the constraint of lack of information and hence the uncertainty attendant upon the selection of a particular alternative.

Businessmen in Sudan tend to favour Khartoum, as it is considered a well serviced province with supplies of clean water, power, roads, communications, education, etc. The concentration of government machinery is another added factor.

The government of Sudan in its quest to bring about social and economic transformation of the country has a positive role to play in influencing the pattern of industrial location. The development of the different retions will not be possible without influencing the investment location decisions. The government recognizes the disparities existing between the different regions as regard income levels, level of economic development, the availability of infra-

structure and social services such as health, recreation, education, housing, etc. The government's role in bridging the gap which exists now is important and cannot be assumed by the private sector. The provision of infrastructure to the different regions is the government's responsibility. It can also help in the development of a growing number of secondary centres of activity (this point will be developed in Chapter Seven). Unfortunately, the role of the government was neglected by the normative theorists. The analysis departs from the real-life situation in the Sudan. More importantly, the assumptions do not hold true. Consequently, it appears that any attempt to determine location in the Sudan through the use of partial or general equilibrium model will be unrealistic due to the multiplicity of the factors involved and the matrix of considerations to be examined.

6.3 Local Determinants

Industrial location in the Sudan is influenced by certain factors (see table 6-3 which shows scaling of the responses). The essential location factors are the availability of infrastructure and market. Transportation, power, water, education, health services play major roles in industrial concentration in the Sudan as their availability is restricted to very few urban cities. Equally important is the market which has been mentioned by 90 per cent of the employers and other respondents from the government and parastatal bodies. Industry in the Sudan is oriented towards the home market, and this is why all processing industries concentrate on articles for end consumption. It is thus not surprising that the majority of these establishments - 73 per cent (see table 6-1) are found in Khartoum province, where most of the Sudan's working

population is concentrated.

Table 6-3

Major Locational Determinants

No	Locational Determinants	Percentage of respondents mentioning the factor
(1)	Infrastructure	90
(2)	Markets	90
(3)	Availability of raw materials and capital	80
(4)	Labour	60
(5)	Industrial linkage	50
(6)	Physical factors	30
(7)	Personal factors	15

Source: Survey Results

Notes (1) Total adds to more than 100 per cent because each respondent mentioned more than one factor.

(2) Infrastructure comprises water, power, transportation, education, communications, etc. A close examination shows that they are all very important to all respondents and development of Khartoum as the major industrial sector.

Other industrial location factors are the availability of labour, raw materials and capital. Industrial interdependence and linkage plays an important role in the generality of external economics and stimulation of investment through linkages. Other factors mentioned

are the physical factors such as geography, topography and climate, as well as personal factors.

The ranking of the factors (table 6-3) shows the significance of these determinants. However, the following points emerge. Firstly:- The survey shows that infrastructure, markets, raw materials, capital, labour and industrial linkage are the most important factors. Secondly:- Their importance varies from one industry to another. Thirdly:- Physical factors are not very important to industrialists in urban centres. Government officials cited this factor as being important for determining location of government sponsored projects which are basically oriented towards the sources of raw materials. Examples are the sugar factories in Guneid and Khash el Girba, onion dehydrating factory in Kassala and fruit canning factories in Wan and Karima.

Fourthly:- These results are different from the findings of surveys conducted in developed countries. The results of Ellis[12] and Katona-Morgan[13] found that personal reasons played the dominant role in influencing manufacturers' decisions to locate in New England and Michigan. Logan, M.L.[14] in his study of location and relocation decisions in the Sydney area and McGraw-Hill[15] in his investigation of the important considerations in selecting a specific site mentioned that land was among the top factors listed. Availability of labour as the most important factor was stressed by Cameron and Clark[16] and Law[17].

However, our results, in table 6-3 show that infrastructure influences and market attraction are the top reasons given, while

personal factors seem to have a less significant role. Of course, it goes without saying that availability of skilled and semi-skilled labour and other economic factors are equally important. The advantages given in table 6-4 tend to confirm that Khartoum province is favoured basically for the availability of the above basic facilities.

In this connexion, it is constructive to note that the presence of these essential facilities per se in Khartoum is what matters to businessmen. By contrast to developed countries, the situation is viewed differently. Their concern is developing and expanding the existing capacities to support further development and stepping up productivity. However, the problem is viewed from another angle in the case of the Sudan, as the main concern is whether or not there is clean water, power, plenty of skilled and semi-skilled labour, etc, available in the province. As a result of these differences, there can be little doubt that the emphasis on locational factors in the Sudan will differ from the spatial component of location decisions in developed countries. In short, the initial spurt of industrial concentration in Khartoum province was influenced by the infra-structure already existing since independence in 1956.

6.3.1 Transportation

At the outset it is worth mentioning that the importance of transport costs as a location factor varies with the size and population density of a country.

The Sudan, as we have already mentioned, is the largest country in Africa in area, as it covers 2.6 million square kilometers,

Table 6-4

Advantages of locating in Khartoum Province

No	Advantage*
(1)	Availability of power
(2)	Availability of water
(3)	Availability of transportation
(4)	Good communication system
(5)	Concentration of government machinery
(6)	General services
(7)	Proximity to market
(8)	Quality of life

Source: Survey Results

*The above factors were mentioned by almost all the respondents during the survey.

Table 6-5

Disadvantages of locating in Khartoum Province

No	Disadvantage*
(1)	General problems of over-concentration
(2)	Personal transportation
(3)	Absenteeism
(4)	Lack of housing facilities
(5)	No room for future expansion

Source: Survey Results

*The above disadvantages were mentioned by the respondents during the survey.

Table 6-6

Location if Starting from Scratch

No	Location	%
(1)	Inside Khartoum province	75
(2)	Blue Nile province	20
(3)	Elsewhere	3
(4)	Do not know	2
	TOTAL	100

Source: Survey Results

forming approximately eight per cent of the land surface of Africa. With an estimated population of only 16 million, the Sudan has a low population density of slightly over six persons per square kilometer.

Having said that, the development in the Sudan is hindered by the considerable distances between potential areas of production and consumption. It is interesting to note that the transportation network in the country is shaped like a fan with Khartoum as a dominant transportation node where routes branch out to some few urban centres in the country, with no interconnecting links to regions in the periphery and thus increasing the distance to and from these regions and promoting economic concentration. This is why we find regions which are poorly provided with a network of communications lack industrialization. Of course, it goes without saying that other factors are also responsible, but no one could deny that the absence of reliable inter-regional surface transport

links caused the following problems:

(a) Seriously hampered agricultural, industrial and commercial development.

(b) Reduction in the rate of implementation of major development projects.

(c) Hindering of national integration.

(d) Constant delays and uncertainties in all forms of economic activity.

Because Khartoum province is provided with an efficient network of communication, we find the country's largest industrial concentration, with virtually no other bases elsewhere. At present, there are four major modes of transportation, namely rail, road, river and air. These modes provide a sparse and far flung transportation infrastructure.

In recent years a rapid increase in transport demand has placed a tremendous burden on the railways. Road transport services have taken up some of the growth in demand, but rail is still the predominant mode of transport within the country. The difficulties faced by the railroad have included: (1) insufficient locomotives and rolling stock, (2) lack of spare parts, and (3) physical damage to the track caused by washouts, sand dunes and excessive heat. These external factors combined with administrative problems have resulted in scheduling delays, low operating speeds, locomotive breakdowns, and an average turn-over time for repair of freight wagons of 16 days.

The government is paying a lot of attention to upgrading the railway system by capital investment in fleet expansion and track improvement and by raising the operating efficiency through personnel training and the installation of communication systems for better traffic control.

All these aspects have now been taken into account in the new Six Year Plan (1977/78 - 1982/83). The provisional allocation for the railways in the new plan amounts to £65.37 million (table 6-7) all earmarked to new projects. The planned improvement in the physical facilities of the railway system should improve the operating efficiency through increasing actual train speed and net average load per train, and reducing track maintenance costs, delays caused by washouts, and waiting time in crossing between stations in links with double tracks.

The low efficiency of the railway system focused attention on the neglected road system. The existing road network is very limited, mainly due to the fact that road construction and improvement had, for a long time, a low priority in the Sudan. Outside the principal towns there are only about 400 kilometers of asphalt paved roads and about 2550 kilometers of adequately graded roads. Road transport has developed so little that a very large number of potentially productive areas can be reached only by foot or on animals.

In recent years the government has concentrated on expanding the limited network of roads. The government's programme includes the important PortSudan-Khartoum road, which is expected to be completed

Table 6-7

Transportation Policies (£s million - 1976 prices)

Subsector	Ongoing Projects	New Projects	Total
Railways	nil	65.37	65.37
Roads	65.54	59.00	124.54
River	4.36	4.13	8.49
Civil Aviation	nil	29.00	29.00
Sudan Airways	nil	5.80	5.80
Sea Ports	nil	48.00	48.00
Mechanical Dept.	nil	1.00	1.00
Sub-total (A)	69.90	212.30	282.20
Telecommunication	19.60	15.20	34.80
Post and Telegraph	nil	3.00	3.00
Sub-total (B)	19.60	18.20	37.80
TOTAL (A) + (B)	89.50	230.50	320.00

Source: Ministry of National Planning. Khartoum.

in 1980, and connects PortSudan with cash crop producing areas (PortSudan - Kassala - Gadarif Madani - Khartoum). Total allocation to roads in the Six-Year Plan amounts to £s124.54 million (see Table 6.6), £59.00 million being earmarked for new projects. Four additional projects are also under construction in the south of the country for a total estimated[18] cost of about £s110 million.

Congestion at PortSudan, where there is a shortage of storage and inadequate port handling facilities, has caused major problems for all industries which depend on the port for the importation of raw materials, spare parts and machinery. Investment in new berth and handling equipment and the establishment of the oil pipeline and completion of PortSudan - Khartoum road should result in substantial improvement.

River transport system plays a minor role in the movement of freight and passenger traffice (2.7 per cent of total freight traffic in 1973).[19] However, it is of unique importance in providing bulk freight and passenger traffic between Kosti and Juba (1,436 kilometers) due to the absence of alternative transport facilities. In 1975, the River Transport Corporation was created as an independent public corporation. The aim is to raise the capacity of river transport from 108,000 tons to 333,000 tons in 1977. The corporation received large investment allocation for the improvement of river transport facilities. The Six-Year Plan includes two types of investment to solve the two different problems the river transport problem faces at present, ie, poor port conditions and an obsolete fleet and equipment. Total allocation amounts to £4.13 million of which 82 per cent will be allocated to the purchase of new boats.

Air transport is now also assuming a major role in connecting the various parts of the country. There are 19 airports of which one is international (Khartoum) and three frontier airports (Juba, PortSudan and Gueneina). Khartoum Airport and PortSudan Airport are the only ports with night facilities. Sudan Airways corporation has two

Boeing 707s for international flights which are fully utilized, two Boeing 737s on regional lines, which are used at about 50 per cent of their optimum capacity utilization and five Fokker Friendships which are presently utilized at about one-third of their normal utilization capacity. Runway conditions and lack of necessary navigational aids restrict the capacities of the existing fleet by limiting its flying utilization as well as its operating efficiency. Total allocation as shown in table 6-6 is £5.8 million for Sudan Airways of which £1.00 million is earmarked for the construction of headquarter buildings to accommodate scattered Sudan Airways offices, £4.5 million will be used to purchase new aircraft by 1979, £0.3 million to be used for the procurement and installation of a computer to facilitate booking and accounting activities.

Faced with great prospects for development, the Sudan has experienced the need for an effective transport system, coordinated with all other sectors of the economy in order to serve their requirements. Filling the "missing links" is the first objective of investment in transportation. This is considered as important in meeting the most urgent transportation needs and removing existing bottlenecks. It is hoped that an efficient transport service will influence the location of industries and the kinds of industrial complexes that can be established. As a matter of fact, lack of an adequate system of transport from production centres to the main arteries has been a major hinderance to the economic and social development of potentially rich areas. Hence, if the system of transportation, as a location factor in the Sudan is economical, it could enlarge the scope of markets and open up "growth areas" for locating specialized production centres.

6.3.2 Communication

Traditional methods of communication have been used since the 1870s when the first telegraph was introduced by the Khediwe of Egypt to help to contact his representatives in Sudan. With the coming of the condominium, communication facilities were greatly developed. Telephone facilities, and telex communications were introduced; post offices were opened and officials from the United Kingdom and Egypt were brought to organize these facilities. Radio facilities were introduced in the 1940s and television service in the early 1960s. However, most of these services have been concentrated in Khartoum. Its importance as a factor influencing the locational decisions of firms in Sudan arises from the fact that availability of communication services is restricted to very few urban centres - topped by Khartoum. This is why rural areas had been given top priority.

A plan for connecting all parts of the country by a microwave system is now under execution by an American firm and is scheduled for completion by 1980. It is financed by the Arab Fund. A major earth satellite was established in 1974 for domestic and international purposes. To speed up the completion of these ongoing projects, a sum of £19.60 million was allocated in the Six-Year Plan (see table 6-6). The completion of these projects will effectively link all parts of the country and at the same time, provide easy links with many parts of the world. The new network enabled the introduction of television and telex services to all parts of the country. A marine cable is about to be implemented and it will connect Sudan and Saudi Arabia, whereas the microwave system will

connect Sudan with the Pan-African networks.

Provision of the above services is expected to cater for the rapid expansion of demand domestically and internationally. This will act as an impetus to attract location investment decisions to high priority areas which for a very long time lacked such facilities.

6.3.3 Water Supply

In view of the current rate of industrial development, water assumes a very important role as it is used either directly or indirectly during the industrial process. Since most of Sudan's industries are water consuming industries, most are located along the Nile.

The White and Blue Niles are the main water source for development of lands. Prior to 1959, "Nile Water Agreement" between Egypt and the Sudan gave 4000 million cubic meters to the Sudan and 48000 million cubic meters to Egypt. With the construction of the Aswan High Dam in Egypt and Roseires Dam in the Sudan, the share of Sudan rose to 18.5 milliard cubic meters. The country can still gain more water from swamp reclamation in the south, and the Equatorial Nile Projects. These projects are expected to increase the Sudan's share of water in the future.

Away from the Nile and its tributaries, the country is totally dependent upon a low annual rainfall which is seasonal and whose amount varies from year to year. This is why we find very limited industrial developments in Elobeid, Nayala and Babanusa. It is worth emphasizing that there is acute urgency for improvements to the water supply situation in these places as water is a prerequisite

to sustaining a healthy rural as well as urban economy. In this connexion, it is worth mentioning the fact that 48.5 per cent of the total area of Sudan is desert and semi-desert with an average annual rainfall of 0.75mm and 75-300mm respectively. To add insult to injury, the desert encrouchment in the African 'Sahel' region has affected the Sudan.

In Red Sea province there has been a reduction in annual levels of rainfall thus leading to conditions of drought which are more acute than before. This drought has contributed directly to the very rapid population expansion (through the migration of nomadic peoples of the region) of PortSudan. The town itself is suffering from scarce supplies of water. In this situation of water scarcity, decisions about priorities for water consumption in the town and its adjacent areas has become critical. Shortages of water may well impose restriction on the port activities, as since the reopening of the Suez Canal demand for water by ships has increased rapidly. Similarly, industrial expansion has been hampered by the shortage of water. The only spinning factory in the city has been designed with a modern circulated water system to conserve water, but nevertheless, there remain problems of providing sufficient water throughout the year. Shortages of water has also affected the oil refinery to an extent that the entire operation of the refinery itself is put at risk.

The situation in Khartoum province is different as it has the highest total annual per capita consumption of water (see table 6-8).

Table 6-8

Khartoum Province Water Consumption (1974/75)

Town	Consumption in m^3	Total Population	Annual per capita consumption in m^3
Khartoum	18,009,845	333,921	54
Khartoum North	7,721,126	150,991	51
Omdurman	9,650,008	299,401	32
TOTAL	35,380,979	784,313	45

Source: Public Electricity and Water Corporation. Khartoum.

All in all, the three towns have no water problem and this partially explains the highest industrial concentration in this region.

6.3.4 Power

Electric power for general consumption in the Sudan is the responsibility of the Public Electricity and Water Corporation. In some cases part of the consumption is generated by the consumers themselves because the PEWC cannot cope with demand. For example, in PortSudan only 25 per cent of electricity consumption is provided by the PEWC, while 75 per cent is generated by consumers.

A number of industrial users pointed to the fact that PEWC generated electricity was unreliable and power cuts were common, especially in the summer months. This has led many industries to obtain recently their own generating capacity, either to be used in case of a PEWC power cut or as a total substitute for power from PEWC. These industrialists also felt that no sooner would the increased

PEWC power generating equipment be installed, demand would rise to overtake it again. The basic problem was seen as one in which power supply was unable to cope with demand.

The three towns (Khartoum, Khartoum North and Omdurman) have 55 per cent of their consumption for domestic purposes, 39.6 per cent for industrial use, 3.17 per cent for agricultural use and 1.78 per cent for other uses[20]. Khartoum province has the lowest prices for electricity, especially for domestic and commercial use. Electricity for industrial and agricultural uses is offered at unified rates.

Electricity supply in the Sudan falls under five broad categories, with the following installed and proposed capacities. The total installed plant capacity is 210,600 Kw. More than 80 per cent of publicly supplied electricity is generated in the Blue Nile Grid. The systems are not interconnected, except for groups (1) and (2) where interconnection possibilities may develop in the foreseeable future. Other towns served by PEWC include Kassala, Elobied, Juba, Malakal, Wan, Shendi, Elfasher, El Dueim, Elgorashi, ElGenana, El Menagil and several smaller towns. Industrialists are required to check with PEWC as regards the availability of power of suitable capacity, before committing themselves to the purchase of installations requiring relatively large power inputs. Such confirmation is crucial if the proposed installation is going to be located in any of the smaller areas served.

It has been established that industry is the main consumer of electric power in the major load centres. Recognizing this fact,

Table 6-9

Electric Power Generating Capacity

No	Area	Generating Plant Capacity Kw)	
		Installed	Proposed (up to 1982)
(1)	Khartoum and the Blue Nile Area	170,000	55,000
(2)	Eastern Area	16,800	3,000
(3)	Northern Area	8,200	3,000
(4)	PortSudan	7,900	6,000
(5)	Self Generating Industry	7,700	N.A.
	TOTAL	210,600	77,000

Source: PEWC. Khartoum.

Notes (1) The Grid serves Greater Khartoum, Hassa Heisa, Wad Medani, Merturegan, Sennar, Rubak and Damazin.

(2) Serving Khashm el Girba, New Halfa, Shourok, Gedaref, and Kassala.

(3) Serving Atbra, Berber and Damen.

(4) PortSudan

PEWC has already prepared a set of separate low medium and high forecasts for peak demands of energy requirements.

Allocations in the new Six-Year Plan amount to £70.42 million of which £14.32 million are earmarked for projects already under execution. New projects include (a) Hydro Power Expansion at the existing Roseires Power Station, (b) Thermal Power Expansion, (c) the introduction of electrical supply in eight small towns by using small isolated diesel power stations, and (d) expansion and

reinforcement of the distribution network.

As shown in table (6-9) the greater part of electric power generating capacity is centralized in the Khartoum-Gezira area. This has tended to concentrate industrial development in these regions. For reasons of inducing industrial dispersion in Sudan, some effort should be made to develop hydroelectric power sites as the country is fortunate in possessing a large potential for this type of power. 60 per cent of power comes from hydroelectric generation and development plans call for more intensive use of the Nile and its main tributaries.

6.3.5 Markets

For nine out of ten industrialists in Greater Khartoum area, market has been an essential location factor. Since industry is oriented towards production of consumer goods, it is not surprising that the majority of establishments are found in urban centres where most of the country's population is concentrated with the highest incomes earned and consequently the highest purchasing power. In socialist countries, population and manpower are among the top factors affecting the distribution of industry which is taken to be one of the major principal means for controlling the territorial settlement of people and the employment rate in every region.

The population of Khartoum, Khartoum North and Omdurman is said to be doubling every decade. The per capita income in these three towns is three times as high as the national average[21]. High per capita income expands the market opportunities which in turn maximizes the rate of growth of sales of firms. However, this

does not mean that sales maximization is the only objective that industrialists in the three towns pursue.

The printing industry is highly concentrated in Khartoum province. This is attributable to the fact that Khartoum comprises the lion's share of educational institutions. Most of the industries that add weight during the process of manufacturing or perishable goods seek locations readily accessible to their markets. Examples of these are the beverage industries, soft drinks, ice cream, bakery products, dairy products, etc. Also, industries that require market accessibility for effective technical servicing are best located near the market.

6.3.6 Physical Factors

The location of natural resources plays an important role in influencing the distribution of industry. However, in the Sudan very little is known about the country's resources of mineral and non-mineral deposits. Geological studies in the Sudan are still not revealing much. At the present the available knowledge is neither detailed nor very accurate and meaningful. This is due to the very insignificant financial and human resources allocated to geological studies.

The meagre information available suggests that there are several mineral and non-mineral deposits in the country such as gold, silver, iron, copper, petroleum, gas, chalk, gypsum and several others. So far, the thorough geological, geophysical and economic feasibility studies for the commercial extraction of these deposits are either lacking or in their very early stages. Very few of these deposits

are commercially exploited and then only on a small scale.

So far the absence of large mineral deposits suggests that there are favourable potentialities for agricultural production, livestock and forestry. Some of the agricultural industries must be located near the sources of their agricultural raw materials. Sugar processing, for example, needs to be close to supplies of cane, ginneries to be close to supplies of cotton, and oil crushing mills near the producing areas in the western part of the Sudan. All these locations are considered to be points with minimum transfer costs. Weber's model is a classical example to the distribution of these industries. However, while Weber neglected the climatic conditions, these places depend extensively on rainfall or irrigation from the Nile. So the climatic conditions have a considerable bearing on their distribution, contrary to the negligence of this factor by the early theorists of industrial location.

The northern part of the Sudan accounts for only 2.4 per cent of the establishments, and 2.7 per cent of the workers. The physical factors are partly responsible for this very narrow industrial base, albeit other factors are also to be blamed. Southward, Atbra, the fourth industrial centre, and Khartoum, the largest industrial area, are both served by the Nile. Other industrial centres have grown along the Nile and its tributaries. Accordingly, Central Sudan and the Nile Corridor proved to be the most important axes of population concentration and economic development. Needless to say, the major proposed industrial developments are located within this region. Away from the Nile, large scale industrial development is limited due

to the scarcity of water. In these regions, water for domestic and livestock use is given priority over industry.

6.3.7 Availability of Labour Force

Undoubtedly availability of labour force plays a significant role in determining the pattern of distribution of economic activity. This is attributed to two major factors. Firstly, human beings are the source of economic activity; their needs create the demand for goods to be produced and services to be performed. Secondly, the supply of goods and services will not be possible without the efforts of people.

Despite the above importance of labour as a factor of production, many developing countries give less attention to its role in the process of development and emphasize the role of capital investment(22). However, this is not always true as some studies demonstrated that the correlation between the amounts of capital received in past decades and the growth performance is very weak in underdeveloped countries(23).

In the Sudan there is no problem with the abundance of labour, but the real problem emerges from lack of skill and training. Although Sudan is relatively well endowed with educated men in comparison with other developing countries, little attention has been given to the technical training in the past. The educational system was very much biased towards academic training, with each level of school concentrating on preparing pupils for the next levels, rather than providing any technical and other practical skills which the country needed. More important is the uneven geographical distribution of

enrolments, the ratio of urban to rural children at schools is 3:1, and enrolment rates are six times higher in the north than in the south. The result is shortage of skilled manpower which has adverse effects on industrial development. Some industries have provided their own centres of training because the state training centres do not cater for their demands. An example is Kenana sugar factory which built a training school on the estate with a compliment of full-time instructors to provide the additional modules of skill specially directed towards the needs of the sugar estate. The emphasis would mostly be given to "on the job" training.

Now there are nine training and development centres which offer one year vocational courses for those who dropped out of the general education programme[24]. These centres are located in El-Obeid, Nyala, Juba, Malakal, Atbra, WadMedani, Roseires and Omdurman. Beside the above sources for semi-skilled labour, there are four apprenticeship training centres run by the department of labour, as well as others at the Mechanical Transport Department, the Sudan Railways and the Gezira Board. In addition, there are six national industrial schools. But still supply falls drastically short of demand and efforts by the government, parastatal bodies, and the private sector should be directed towards creating an adequate pool of semi-skilled and skilled labour. Some industrialists expressed concern about the lack of skilled labour; should the situation continue, they might resort to using capital intensive machinery.

It is the above dearth of skilled and trained labour - particularly outside the three towns, that causes problems to manufacturers.

There is an even more serious shortage of Sudanese personnel in management and other highly technical jobs which are usually filled by high-salaried expatriates.

Regarding unskilled labour, there is a continuous inflow of employable persons from various parts of the country to the urban centres. The textile factories in Khartoum North are making the most of this situation, as the factories were originally planned as labour intensive for two counts. Firstly, establishment of ultra-modern industry requires, of necessity, the expenditure of very large amounts of capital outlay which is not available in the Sudan. Secondly, the industry is assumed to provide employment opportunities, and fully automated and integrated mills would defeat this purpose.

An interesting feature of the labour force in the Sudan is its instability. Most of those who originally come from rural areas seem to retain interest in the village life. So when they save some money they tend to go back to their roots. This is really harmful to the economic progress of both the individual worker and the industry. Absenteeism is another serious problem facing industries in urban centres. It is harmful to the employer as it causes him loss of production, to the worker as it reduces his earnings and to the nation as it means reduction in the gross national product. Employers should therefore try to solve this problem by studying its causes and provide the necessary measures to reduce the losses caused by absenteeism(25).

All in all, without an organized and effective training system, the chances of industrial development will be seriously hampered. The

government have to recognize the magnitude of the problem and efforts have already started to improve and develop the knowledge, skills and abilities of the people in order to achieve the planned rate of development. The Six-Year Plan of economic and social development (1977/78 - 1982/83) aims to achieve an annual growth rate of 7.5 per cent. This requires the physical and mental abilities of qualified people to push the wheel of production forward in order to attain the above rate.

6.3.8 Industrial Linkage and Interdependence

This is an important determinant of location, however it is very difficult to assess. Concentration of pools of skilled labour, availability of specialized services (banking, insurance, consultancy, legal, social, etc) power, water, efficient communication systems, large markets and other things that provide the impetus for further development will lead to expansion of industrial output. The expansion of production of some industries will consequently lead to raising output demand or reducing the cost of production in other related industries. This advantage of generated external economics (appropriated by the related industry) takes place in urban centres only, because urban centres are capable of providing the facilities which are not existing in rural areas.

Khartoum province has attracted investors (both local and foreign) who have been inhibited from investing elsewhere because of the narrow markets in rural areas and lack of essential facilities, to invest in its urban centres. Such investment makes use of the external economics generated by pre-existing industries, and generates some itself.(26) These advantages of external economics, are made possible through the linkages that take place between firms located in the same urban centres.

Industrial linkage could take several forms. First, production linkage where materials are moved between firms as part of the production process. Secondly, service linkages take place when facilities and services are either shared or exchanged. Thirdly, market linkages exist with firms whose function is to distribute the final products of firms through the established channels of distribution.

The major urban centres in the Sudan, particularly the three towns, enjoy the advantage of external economics as a result of industrial interdependence. One form of industrial interdependence is evident in Khartoum province and stimulates external economics is vertical linkage. An example can be cited from the relationship that exists between a firm producing household utensils and another producing a similar product, but each firm carries a stage of the industrial process.

A second form of linkage which is also evident in Khartoum is residentiary linkage. This is indirect interdependence and works through changes in factor income. To illustrate the point, an increase in the incomes of the employees of Sudan Textile factory, due to increase in output, will lead to an increased demand for the output of the food processing factories in the region; as they will spend their incomes in purchasing consumer goods and thus raising demand for such food manufacture.

A third form of linkage is backward which is direct and results from

the vertical interdependence of manufacturing activities. An increase in the consumption of soft drinks will stimulate more demand for bottles. Another backward linkage occurs between the plastic sacks factory located at Khartoum North which provides flour mills in the area with sacks for flour packing. An expansion in the production of flour mills will entail an increase in demand for the output of plastic sacks. Sometimes the stimulus proceeds from earlier stages of production to later ones - unlike backward linkage. Such forms of industrial interdependence which may stimulate external economics is called forward linkage.

So it is clear that industrial concentration as in the case of the three towns breed further concentration and aglomeration. The advantages of reasonable levels of services for industries (banking, security, labour, health, education, etc) together with the benefits of linkages and interdependence will act as a driving force to attract more industries to the same areas.

6.3.9 Personal Factors

For some industrialists, some factors, other than the technological, economical and physical considerations that figure so importantly in location theory, are prominent in determination of industrial location. This range includes personal preferences for certain areas. In developed countries, this attitude may be more acceptable, as with the development of markets, and advancement of technology, transportation and expansion of the capacity of infrastructure in all regions of the country gives the industrialist a choice of many more options than in the past.

By contrast, industrialists in the Sudan do not have this wide range of options as infrastructure facilities are provided in a few urban centres only. Nevertheless some opt for certain areas for purely personal reasons, with secondary regard only to the matrix of considerations which is usually examined when the decision is taken. Of course, decisions are made by people, and people have their individual likes and dislikes, but one expects people to be objective in taking non-routine decisions. One industrialist categorically stated that he has located his factory in its present site because this is his home, and he feels very secure there, and enjoys his life. Other attractive factors are related to the quality of life in certain urban areas.

6.4 Summary

The chapter has noted that in most developing countries industries tend to over concentrate in few urban centres. The pattern in the Sudan is similar to the above, as the most privileged axis lies along the Nile and its tributaries where population density is higher and development relatively advanced. Recent statistics reveal that Khartoum province accounts for 73 per cent of the total number of establishments in the Sudan; it also accommodates 64 per cent of the workers employed in the industrial sector, 58 per cent of all the agricultural food processing industries and 64 per cent of the agricultural non-food industries.

The analysis revealed that the normative theory of location, which advocates maximization of profits as the principal concern of business

men, and that there is perfect knowledge, absolute rationality of decision makers and no institutional rigidities, is too restrictive when applied to a country like the Sudan due to the complexity of factors that are to be considered and examined in real life. Consequently, varying patterns of industrial location are adopted by industrialists. This does not mean that we are dispensing altogether with demand and cost factors. Indeed, we can find some locations which partially follow Weber's formulation; particularly industries with high material index (ratio of used localized material to the weight of the whole product).

However, an in depth analysis will show that the least cost model does not take into account other pecuniary and non-pecuniary factors. The latter has considerable influence in the concentration of industries in the few urban centres. The government also plays a positive role in the process of influencing the location of investment decisions. Moreover, the model does not also consider the causal factors which sometimes influence the locational decision. It follows that there is a need for enlarging the location theory, and this has been indicated by a number of people. Pred, for example, argues that location theory should incorporate both economic and non-economic factors. In his own words, "... such a body of theory would embellish existing (economic) location theory by taking into account irrational behaviour, imperfect knowledge, other psychological variables, socially dictated constraints and the impact of existing patterns on subsequent processes."(27)

The study also pointed out that infrastructure facilities (physical and social) and the market are the major factors that determine

location in the Sudan. The situation regarding the former in the Sudan is different from that in a developed country. In the UK, for example, the infrastructure supply issue often concerns problems of the expansion of the existing capacity to support further development. In Sudan, the issue is visualized from the angle of the availability or the non-availability of the services per se. Another important point that emerged with respect to infrastructure is the complementarity of services which must be recognized, and that the supply of facilities has to be on collective, rather than individual basis.

A major point that can be concluded from this chapter, also, is the disparity in the relative significance of location factors between firms in developed countries and the Sudan. With respect to the Sudan, our study has shown the importance of infrastructural facilities and markets, where in countries like the UK, availability of trainable labour, land for expansion and personal factors are among the top factors. This explains in a way, the disparity in levels of development of basic industrial services between developed, and less developed countries.

CHAPTER SEVEN

CHAPTER SEVEN

THE ROLE OF THE GOVERNMENT

7.1 Introduction:-

In the previous chapter we discussed the pattern of industrial location in the Sudan. We also gained insight into the determinants that influence the distribution of economic activities.

This chapter will take up the role of the Sudanese government in influencing the investment location decisions, in order to cut down the economic and social disparities which presently exist between various provinces as regards income level, level of economic development, the availability of infrastructure and social services. Here answers are sought to two key questions:-

(a) What are the main forms of government intervention designed to influence the investment location decision? These can be conveniently seen in three main areas. First:- direct State participation in productive activity with the State as entrepreneur; second:- policies and institutional assistance designed to encourage private investors; third:- efforts of economic planning.

(b) What key policy reforms are required to correct the present locational maladjustments?

The extent to which a government influences the rate at which industry grows in a given region varies with the system of government. On the one hand, in socialist countries, the economy is very much centralized and the state has complete control over decision making and consequently distribution of productive forces. Needless to say, nearly all factors of production, with the exception of labour, are owned by the State. Even labour is controlled and manipulated from the centre. The State attaches great importance to the problem of the rational distribution of industry, in terms of cutting down production costs, speeding up the rate of growth of the national economy, and making possible a proper economic balance among the various regions of the country.

The location of industry is considered from the viewpoint of the optimum development of the whole. In this connexion, two points are considered. Firstly, maintenance of a given volume of production for the country as a whole at a minimum cost, and secondly, provision of given levels of well-being for regional populations. It is worth mentioning that the minimum cost is not an end in itself, but saving can be used for enhancing the living standards and increasing the growth rate of the economy.

On the other hand, the influence of the State in the non-socialist countries varies from one country to another. In the United States, for example, the role of the State is minimal and a lot of the initiative rests with industrialists. While in the United Kingdom government policies are regarded as a crucial factor influencing the location decision; it goes without saying that government concern with the location of industry dates back to the depressed

years of the 30's. Many Acts were introduced in order to direct the work into closely defined districts. For example, the 1950 Distribution of Industry Act empowered the then Board of Trade to make grants and loans to firms setting up in the Development Areas; to assist financially with the provision of houses; and to make loans and grants towards the costs of removal and relocation of key workers. These measures were considered positive inducements to attract industrialists to where the government wanted them to go.

The main justification for the above measures is "to attain some wider political policy objective such as that involved in regional policy."[1] Two cases can be cited to illustrate the point. Firstly, the financial inducement given to Ford in order to locate their new plant in Bridgend. The last Labour government offered Ford 40 per cent of the capital cost (about £70 million) to ensure that the plant was established in Wales. The political motive behind the decision is clear, as the then Prime Minister who agreed to the terms was the member of parliament for that locality. Secondly, the very recent announcements made by the present Conservative government in the House of Commons during the Labour censure debate on the government's unemployment record. The measures were designed to bring jobs to areas of high unemployment. £25 million would be paid to Inmos, however the amount is contingent upon building the factory on Wouth Wales development area, and not, as the company hand wanted, in Bristol. This would provide 2,000 new state-financed manufacturing jobs. In addition to that, seven 'enterprise zones' are to be established in inner city areas, in which businesses would be given incentives at a cost in lost rate and tax revenues of about £10 million a year[2]. The political objective behind the

announcements is crystal clear. The government was accused of deliberately increasing unemployment; and hence the measures were seen as a way of buying off a censure motion.

Two main objectives emerge as a result of government policies on industrial location. Firstly, dispersal from congested areas and over developed areas:- the French experience is a good illustration of this point. Between 1954 and 1968 the Paris population had risen from 7.3 million to 9.2 million, while the population of the remaining regions of France grew by 2.6 million. Another indicator of uneveness was the average gross per capita income which stood at 139 per cent of the national average with respect to Paris, while all, but one, regions were below the national average - ranging from 81 per cent to 98 per cent. Other problems cropped up as a result of these disparities; namely (a) the problems of finding alternative jobs in regions affected by the decline in basic industries (agriculture and mining); (b) adaptation of existing amenities in urban centres to cope with the growth of population; (c) the problem of providing alternative urban centres capable of fulfilling, in part, some of the services centralized in Paris, and finally (d) the growth of the economy in a way which enables lessening of regional disparities. To solve the above problems, the French government introduced a threefold policy: (1) Assistance to industry to provide jobs in depressed regions. This was coupled with controls to curb the growth of the Paris region. (2) Provision of alternative urban centres in which industrial development can occur by development and utilization of an already existing infrastructure and (3), provision of infrastructure in rural areas.

The second objective of industrial location policies is to enhance the growth of the underdeveloped regions to eradicate regional disparities.

The Sudanese government is at present faced with the problem of locational maladjustments due to the disorderly growth of urban centres. With the growth of Khartoum North, Khartoum and Omdurman, social and economic problems have emerged, connected with concentration of both population and industrial enterprises. The rest of the country is relatively neglected. The per capita income, in certain regions of the country, is about half that of the national average. Communications are poor, and most regions of the country await development. The gap between the very few developed centres and the rest of the country would continue to widen year after year unless measures are taken by the government to provide employment opportunities, improve the standard of living and achieve an optimum use of resources in neglected areas. It is evident that the government has a responsibility in ensuring that the location of economic activities is in the national interest as a whole. Thus, in the next section, to keep in line with our descriptive-analytical approach, we shall examine the evolution of government policies directed towards influencing patterns of manufacturing investment and choice of location; the reasons for these policies and the proper ways to improve them.

7.2 Evolution of Government Policies

7.2.1 Pre 1956:-

It was pointed out earlier that prior to independence, Sudan did

not witness any serious attempts geared towards embarking on the road of industrial development. Apart from traditional industries such as ivory work, leather and wood products, which have been in existence for centuries, the country was left with a very narrow industrial base. Cottage-type industries were based on local raw materials, national craftsmen and required only a small capital[3]. It was the intention of the colonial authorities that Sudan should be directed towards the production of primary agricultural products for export. The Gezira Scheme was set up in 1925 to produce cotton to export and the establishment of cotton-ginning factories in the Gezira region marked the first signals of modern industry in Sudan.

The outbreak of the Second World War made it difficult to import goods and hence it was felt necessary to establish certain industries to meet the demand for goods which were no longer imported. An Industry Investigation Committee was set up to advise the War Supply Department on the projects that should be established, with the understanding of utilizing local raw materials. The emphasis was all the time on industries geared towards relieving the country of the need to rely on imports. Consequently, a number of factories such as oil-mills, soap, confectionaries and syrups were established. However, these enterprises failed to stand the competition of imported goods when importation was resumed after the war. They initially lacked proper studies and hence their quality was low, quantity limited and prices very high. As a result, all of them closed down, leaving a very bitter experience to which businessmen who are still alive, refer with sadness whenever the issue of industrialization is raised.

7.2.2 The 1956-1960 Period:-

Convinced of the decisive role of industry in diversifying the economy and achieving an increase in national income, the national government in 1956 announced its policy of industrial investment; stressing that the field of industry was to be left to the private sector and that no discrimination would be made against foreign enterprises.

Following the announcement of this policy, the government issued the "Approval Enterprises (Concessions) Act 1956" in order to confirm its policies and encourage both foreign and local capital to be invested in the country(4). The government established an Advisory Committee to which all applications for government assistance from private enterprises are referred. The criteria for consideration of any project were as follows:-

(1) Importance of the project to the national interest, ie, employment opportunities, savings in foreign exchange that would result, its strategic aspects for the industrial structure etc.

(2) The project must be commercially viable. It must have had favourable prospects of successful development.

(3) Its functions must not already be adequately performed within the country.

Having satisfied the above criteria, the committee would then assess the assistance that the project should have. The main

concession provided by the Act was relief from business profit taxes for a period of two to five years depending on the amount of capital employed in the enterprise. If the capital employed was less than Ls20,000, the period of relief would be two years. In cases where the capital was more than Ls100,000 at the end of three years, the period of relief would be five years.

In addition, the enterprise may:

(1) be granted relief from, or reduction of import duties on imported machinery and raw materials;

(2) be granted permission to employ expatriate experts and technicians;

(3) be given a suitable plot of land at a nominal price;

(4) be allowed to depreciate assets at double the normal rates;

(5) be granted preferential railway tariff rates;

(6) be assured government orders for a prescribed period;

(7) be given assurance of a local market through tariff protection or restriction of imports.

The effects of the Act were favourable as the number of industrial enterprises multiplied. Industrial investment rose from 540,000 Sudanese pounds in 1956 to Ls2.7 million in 1959.

The prime concern of the Act was with growth of the manufacturing

sector in the Sudan. Ostensibly, the spatial impact of this early policy was to encourage the location of industry in Khartoum region, which already possessed a comparative advantage. This is why we find most, if not all, of enterprises concentrated in Khartoum North, Khartoum and Omdurman. An important feature of that era was the absence of economic planning and as a result the industrial sector fell into the hands of the private sector and was developing only through incentives and without any directives. The Act did not consider problems such as established industrial priorities and offering more facilities for the establishment of strategic industries utilizing agricultural produce.

7.2.3 The 1960-1970 period:

Recognizing that a positive action in the provision of capital was required in order to create a genuine stimulus for private enterprise to engage in industry, the government established in 1961, the Industrial Bank of Sudan to assist and promote the establishment and modernization of private industrial enterprises in the Sudan. It was also recognized that the country was suffering from a scarcity of viable and clearly located investment projects, and hence the bank was also charged with the responsibility of providing technical assistance to private industrial enterprise.

It was specified by the first annual report of the board of directors that the Industrial Bank of Sudan "should be equipped with capital, sufficient to provide for the financial needs of new industries, in the initial period of activity, and be organized, managed and staffed adequately to provide extensive technical assistance and guidance for new industrial projects, to perform research into new

fields of industrial production suitable for operations by private enterprises ... ."[5] So apart from filling a gap in the financial structure, the bank was also expected to provide technical advice to both new and existing privately owned enterprises.

All the bank's share capital is owned by the Central Bank of Sudan. In August 1974, its authorised capital was raised to Ls5 million and by the end of that year, it had made net advances of over Ls4 million in 139 loan operations[6]. Over the whole of its operations, it has furnished about one third of the capital invested in the concerns to which it has been lending. Finance is offered for fixed assets and initial working capital only. Efforts have recently been made by providing commercial services to borrowers (feasibility studies, letters of credit, etc). Another encouraging sign is the wide range of industries that have been assisted. The list includes building materials, textiles and tailoring, vegetable oil mills, flour mills, printing and packaging and other industries.

It is worth mentioning that the Bank does not possess branch offices and operates entirely from its head office in Khartoum. Its activities focus on medium and large scale projects. Once again, about 58 per cent of its loans were for projects in the Greater Khartoum area (see table 7-1). The Bank has no plans for establishing a branch network and, although efforts are being made to widen the geographical spread of its activities, it seems very likely that most of its loans will continue to be directed to large and medium scale industrial ventures in the main urban centres.

Another specialized bank established in 1966 is "The ESTATE BANK".

Its main function is to provide loans for the construction or improvement of houses and other buildings. The Bank is also owned by the Central Bank of Sudan. Once again, it has operated mainly in the Greater Khartoum area with no loan whatsoever to any other regions until 1976, when the Bank opened its only branch in Elobeid.

Table 7-1

Regional Distribution of Industrial Bank Loans 1962 - 1976

Province	Amount of loans disbursed (Ls 000)	Percentage of total disbursements
Khartoum	4898	58
El Gezira	1516	18
Nile	558	10
Bahr El Ghazal	71	1
Blue Nile	241	3
Equatoria	56	1
Kassala	253	3
S Darfour	58	1
White Nile	290	3
Upper Nile	78	1

Source: Government of Sudan, Industrial Bank "Annual Reports" for the period 1962 - 67, Khartoum.

The 1960's witnessed a significant change of direction in the government's policy towards industry as it decided to enter the sphere of industry which was hitherto restricted to the private initiative.

Nine factories, costing Ls23 million were established by the State. Eight were located outside Khartoum. However, this first step by the State did not represent any important shift from the previously declared policies. This seems clear when we examine the reasons of the State for entering the sphere of industry. "The specific reasons for public investment just in these types of manufacturing are in some cases the size of investment (as with sugar production) and in others, as yet, the lack of interest, or rather hesitation so far in the part of the private sector."(7) This indicates clearly assigning a catalytic role to the private sector and that the State played only a peripheral role that was very much limited in its scope. More attention was given to the private sector, as the 1956 Act was superseded by the "Organization and Promotion of Industrial Investment Act, 1967", which came into effect in March 1968. The new act augmented the assistance offered in the 1956 Act and attempted to alleviate the problems encountered in its administration. But it appeared that the prime concern of both Acts was with the growth of manufacturing activity in aggregate.

The government saw its prime role in providing public utilities in areas where the private capital was not forthcoming. Khartoum province had the lion's share, with other regions relatively neglected. Businessmen continued to concentrate at the Centre, thus widening the gap more than ever.

Moreover, the State experience with industrialization was faced with many inefficiencies and failures for one major reason: the ad hoc, and the most crude location adopted by the government at that time. It is perplexing to note that no objective criterion

for selection of the sites was followed, nor were any socio-economic technical and commercial feasibility studies made. To illustrate the point, let us cite the cases of the following factories.

Firstly, Aroma Cardboard Factory:- This factory was located in the North-Eastern part of the Sudan; intended to satisfy the needs of the local market for the various cardboard types utilizing cotton stalks as its raw material. Unfortunately, after finishing construction of the project, it became known that cotton stalks proved to be the wrong type of raw material for that factory. The factory was only capable of producing inflexible cardboard sheets for which there was no demand at all. Added to that, the cost of production was 450 per cent of the selling price (during 1963-68 the average cost of production per ton was Ls180 while its selling price was Ls40). Two reasons were given to justify this prohibitive cost. Firstly, the high transportation costs of cotton stalks from cotton fields to the factory which was five times higher than the cost of the raw material itself. It would have been more reasonable to locate it in the Gezira area where the factory could enjoy the benefits of cheap continuous flow of raw materials as well as other facilities. Secondly, the unsuitable location of the factory in relation to the nearest water supply source which lies some 65 kms from the factory. In terms of costs water should have accounted for a small proportion of the manufacturing cost; however, its significance cannot be viewed in terms of cost structure. For the Aroma factory, the bill was Ls7,000 per month. As in the case of other major prerequisites, water should have been looked at from the point of view of whether sufficient quantities of water were

available at that particular site or not. In this particular case, the lack of water supply was a significant factor which doomed the factory from the start. Once again, the Gezira area would have been a better option. Ironically enough, there were no proper studies which preceded the construction of the factory. One report on the factory reads as follows:-

> "After consulting the various files and reports of the factory, it was evident to the committee that no economic and technical studies were made prior to the establishment of this factory."(8)

So, had any pre-investment studies been carried out, it would have shown that the location decision was wrong from the start. To add insult to injury, the factory was also deprived of its raw material source as a result of a decision taken by the "Gash Board" to shift from the growing of cotton to that of castor. Other problems, such as lack of skilled labour, lack of qualified management, etc, aggravated the situation. The end result was a loss of Ls600,000 (which stands to be 83 per cent of the initial capital cost) during the first six years of operation (see table 7-1). The factory has now been closed for the past ten years and if there is any benefit gained by the people in the immediate vicinity of the factory, it is the utilization of electricity, which should have been used by the factory.

Secondly, Babanousa Milk Factory:- Another example was provided by a factory which was initially intended for the production of dehydrated milk, located in Babanousa in the Western part of Sudan. The site was chosen on two major counts. Firstly, the area being an

agrarian area, would ensure sufficient presence of nomads. Secondly, the lactation period was 16 hours which would have enabled the factory to receive a regular supply of milk from the nomads within a vicinity that could be reached by car or other means of transportation within the 16 hours.

After the factory was completed, it was realised that the lactation period - due to the climatic conditions in that area - was actually six hours. As a result the factory remained idle during most months of the year due to the lack of the basic raw material - milk. In fact, the factory up to 1969 was utilizing less than one per cent of its capacity. The factory received supplies of milk during the periods when nomads needed not to move too far from the site in search of water and grazing.

Now after so many trials, and in order to utilize the unused production capacity the dehydration of "Karkadi" - which is a seasonal vegetation that grows very extensively around that area and which attracts markets in the USA and West Germany was introduced. In 1978 the government decided to process gum arabic in the factory and export it tinned rather than raw to the USA and Italy. Paradoxically enough, the factory started, for the first time since its inception, to break even, but not from the dehydration of milk.

A third example of the incorrect locational policy is that of the Onion Dehydrating Factory located in Kassala. The factory was established for the purpose of producing dehydrated onion for export with a total investment of Ls1,060,574. The factory was

burdened with financial losses since its inception in 1966, due to the lack of regular supply of high-solids white onions suitable for processing. Its losses during the first two years of operation were Ls406 thousand. The accumulated losses reached Ls1,075,701 by June 1976[9]. The factory was utilizing about one third of its productive capacity due to the unavailability of the right agricultural raw material.

Table 7-2

Losses incurred by Six State-Owned Factories Since Their Inception

Factory	Period	Total loss Ls 000s	Invested capital Ls 000s	%
(1) Aroma Cardboard Factory	63/64-69/70	600	721	83
(2) Onion Dehydrating Factory	66/67-68/69	406	1075	39
(3) Gunied Sugar Factory	62/63-69/70	6000	10103	60
(4) Karema Canning Factory	66/67-69/70	120	1028	12
(5) Karema Dates Factory	65/66-69/70	49	80	61
(6) Wan Canning Factory	68/69-69/70	144	900	16

Source: Republic of the Sudan: Committee for the Evaluation of State Owned Factories, Khartoum.

The Wan Canning Factory is a further example of the lack of scientific studies to ascertain the availability of adequate raw materials around the area chosen as a site for the factory. The factory was originally intended to satisfy the needs of the southern region of the country for tomato paste processed from fresh tomatoes to be grown there. However, all the tomato paste

produced was made from imported concentrated paste which the factory diluted and packed in small tins. Hardly any tomatoes or other vegetables are grown in this area for three reasons. Firstly, lack of sufficient farmers. The prevailing cultural values in the southern region stand as a serious barrier to persuading people there to take up farming as a form of economic activity; hunting is more appealing to the people there, as the hunters usually establish 'credit' for themselves.

Crops, for the people's consumption, are grown in very small areas adjacent to their huts, which are dispersed throughout the forest.

Secondly, the soils in the area are widely infested with "nematodes" and no sufficient control measures have been introduced by the government. Thirdly, there is a shortage of irrigation water. Although the rainy season extends over seven months (from May to December) its distribution is not predictable and long periods of drought occur. One report on this factory stated:

> "According to the plan made by the Russion experts, this factory needs 2000 tons of vegetables and fruits (50 per cent of which are tomatoes and 30 per cent are fruits such as pineapple, mango and citrus fruits). As evident, whatever available from those raw materials is hardly sufficient for the local consumption, and in fact some of those - like pineapple - are not grown at all in that area."(10)

As a result, the factory had to rely on supplies of fruits brought from some 330 miles away. Needless to say the repercussions of

this on production costs is self-evident.

The losses in El Gunied Sugar Factory during the first eight years of operation amounted to six million Sudanese pounds (about 60 per cent of the total investment in the project). This is attributed to the unsuitability of the location of the factory and the sugar estate. Indeed, this episode is an extension of the ad hoc and crude industrial location policy followed by the government in the early 60's.

El Guneid lies on the east bank of the Blue Nile ($14^{o}50'N$, $33^{o}20'E$), some 120 km south east of Khartoum. It is not primarily a sugar estate but an adaptation to cane of a cotton irrigation layout; namely the same that has been used for years on the famous adjoining Gezira scheme, with the only exception that Guneid's water has been pumped directly from the Blue Nile.

After completion of the project, it was discovered that water distribution was far from being satisfactory owing mainly to inadequate levelling of the land. No soil survey was conducted, albeit it was necessary to ensure the success of the factory after its completion. The farmers entrusted to supply the factory with sugar cane were either nomads without any idea as to what farming was, or were traditional cotton growers, who were not at all familiar with the cultural practice of sugar cane. The net effect of the above problems, coupled with other social problems made this factory weak for the first eight years following its inception. The pound of sugar during that period cost ten times the same pound of sugar that was imported, and though the factory's installed

capacity was 60,000 tons (see table 7-3) it hardly hit more than one-third of this figure.

The above costly initial mistakes could have been avoided by the government had proper project appraisal studies been prepared. The losses were a burden on the tax-payer and a drain on the exchequer.

Table 7-3

Capacity Utilization in Five State-Owned Factories

Factory	Installed Capacity (Tons)	Actual Production 1968/69	Utilized Capacity (percentage)
(1) Aroma Cardboard Factory	4,000	265	7
(2) Babanousa Milk Factory	8,892	1,278	14.4
(3) Kassala Onion Dehydrating Factory	9,000	3,280	36.4
(4) Guneid Sugar Factory	60,000	18,461	31
(5) Karema Canning Factory	8,892	1,278	14.4

Source: Sudan Government: Reports of the Evaluation Committees of State Owned Factories, Khartoum. Also Ministry of Industry and Mining "A Year of Revolution in Industry".

7.2.4 The 1970 Period Onward

The initial shock that resulted from the ad hoc, crude and accidental location policies adopted by the then government made people refrain from indulging in any efforts aiming at industrial development for a period up to the early 1970's. One can safely infer that there was

no clear strategy regarding the distribution of economic activities. The decisions were based on unsystematic and casual factors. Decisions regarding selection of sites for most government sponsored factories were handed down by ministers as orders to be implemented. To add insult to injury, most of the basic ingredients for industrial production were imported; a fact if taken in conjunction with the limited market within the country, coupled with lack of skilled labour and shortages of domestic and foreign financial resources, we find that we have ended up with products that were inferior in quality and higher in price. Moreover, development has been held back by the political instability which Sudan witnessed for a number of years. It showed up as a lack of commitment to specific policies. There is little evidence that successive administrations were firmly committed to economic development.

But nations must overcome the shocks and start thinking positively, especially when they come to realize that remaining static in developmental efforts, with the normal growth in population, will take the country from underdevelopment to least development. Thus, following the May Revolution 1969, important changes were introduced in the direction, character and size of State intervention in industrial planning. The aim was partially to ensure that the right industries were established, and they could function in the knowledge that they would be able to secure the inputs they need and the markets for their products. The government launched an over-ambitious development programme. This is true if compared to the national resources and existing capabilities of the country; however, if one takes into account the overall development projects that should be executed, the whole programme looks like a small island in a wide

ocean.

With the above paradox in mind, policy makers started the revision of the whole issue of industrialization, taking into account that Sudan has been, still is, and will continue to remain basically an agricultural country. With this taken for granted, the main thrust of development would be in the agricultural sector, with industry seen as exploiting opportunities where it has comparative advantages. Subsequently, the first leg of the industrial strategy was the processing of agricultural products which offer sound industrial prospects. Emphasis has therefore been given to sugar and textile industries as they draw more than 70 per cent of their inputs from local resources.

The second leg of the strategy was to disperse the projects throughout the country with two objectives in mind:- (a) The common view among planners' circles is that the country faces problems in transportation, supply of power, clean water, shortages of skilled labour, scarcity of domestic financial resources as well as foreign reserves. So when these problems are brought to the forefront, a pressing need exists for putting the available materials and scarce resources to the best possible use in order to maximize the contribution of the industrial sector to the development process, and thus the location is considered from the so-called "micro-economic" criteria. (b) A macro approach is, however, called for due to political and social considerations which generally crop up and come into play when there are sharp regional disparities. Factories are to be dispersed in order to give an impetus to the expected social transformation and narrow as far as possible regional

inequalities. Central to this, is the fulfillment of the excessive political promises by the political organs for widespread political support. It is an indisputable fact that one of the major challenges for future progress lies in the geographical isolation of the vast areas of rural traditionalism and backwardness. It is hoped that educational facilities, health care, clean water and other related social services will be provided alongside the establishment of the different factories. It is also true that these social services do exert an additional cost to the different projects, but in the final analysis the social benefits are indispensible. Despite the above disputation involved in the issue, there is a general consensus regarding the importance of striking the right balance between the micro criterion (economic viability) and the macro one (social and political considerations).

But whether the right mix being attained or not, that remains to be seen. When it comes to locational decisions of the State-owned factories, the political leadership, the defacto decision makers, used to say the final word. A very senior government official said that the present distribution of most of the textile factories has been based on purely political considerations. To justify the point, he mentioned that the decision was taken without seeking the advice of the professionals and the factories were located in areas with no supply of the basic inputs, ie, cotton and other important prerequisites for the success of the textile industry. It is perplexing to know that those who are supposed to implement the decisions are the main critics of the policy, and they admit openly that they do not know the logic behind such choices. They even mentioned that the tenure of office for a minister is not more

than twelve months and thus most of these ministers do not bother very much about the repercussions of their ad hoc policies. They are more concerned about their physical presence in their jobs than anything else. This obviously leads to declaration of policies beyond that which may be reasonably attained.

Despite the above malpractices, the public sector has been visualized during the last ten years as a leader in the development process. The enlargement of its base and the consolidation of its role in all the productive spheres was cited as one of the "big tasks" by the Chairman of the Revolutionary Command Council when he assumed power in 1969. This was reflected by widening the base of the State-owned sector as a result of the nationalization and confiscation measures announced in May 1970. A number of privately owned enterprises were brought under State control. The number increased by 500 per cent from nine factories to 47, accounting for 17.8 per cent of the total labour force and 24.4 per cent of total wages. In 1970/71, 78 per cent of the raw materials used by the public sector were locally produced. The two major industries (sugar and textile) attracted more than 70 per cent of the volume of investment over the period 1971-1976.

The government, besides owning and managing several industrial companies, is now promoting several large joint venture projects. The Kenana Sugar Factory is the most important of these. Before 1976, public sector industrial enterprises were grouped under the Industrial Production Corporation, a holding company. Now the holding company has been abolished and seven new corporations were created to report directly to the Minister of Industry. These

Table 7-4

Public Investment in Strategic Industries over the Period 1971/76

	Investment Ls million	Percentage of the total
Sugar Industry	104	50
Textiles	43	21
Kenaf Production	21	10
Leather Industry	12	6
Petroleum pipeline	24	13
TOTAL	204	100

Source: Figures worked out from the 1976/77 Industrial Survey. Ministry of Finance. Khartoum

corporations are:

(a) The Sugar and Distilling Corporation

(b) The Food Industries Corporation

(c) The Oil Milling and Soap Corporation

(d) The Leather and Plastic Industries Corporation

(e) The Building Materials Corporation

(f) The Mining Corporation

(g) The Spinning and Weaving Corporation

The above organization suggests the importance of agriculture to industry in the Sudan. This calls for achieving greater integration between agriculture and derived industrial production. There is wide scope for agro-industries which depend on local agricultural raw materials for inputs. On the other hand, industry should serve

the needs of agriculture by manufacturing the basic agricultural inputs such as fertilizers, insecticides, agricultural machinery, tools and spare parts. It is sad to know that an agricultural country such as Sudan does not produce any fertilizers. It is also bewildering and confusing to understand the logic behind making bags for containing agricultural commodities from imported synthetic material, albiet there are natural fibres. Surely industry is not wanted for its own sake!!

In addition to the attention given to the public sector, the role of the private sector has not been ignored. The government has tried to remove all the constraints hindering the participation of private capital, both local and foreign, in industrial investment. To help stimulate foreign and national capital in economic services "The Development and Encouragement of Industrial and Investment Act, 1974" was issued by the government. The Act provides several important concessions which are contingent upon satisfaction of any of the following conditions:

(a) will be of defence or strategic importance,

(b) its production will depend upon local raw materials or the setting up thereof will encourage the production of such materials,

(c) its production will have the effect of dispensing wholly or partially with importation or with contribution in exportation,

(d) that it shall directly or indirectly provide employment potentialities to Sudanese people,

(e) its work shall contribute in increasing national income,

(f) its work shall contribute in achieving the aims of economic co-operation and integration with Arab and African States.

The concessions given to encourage investment by the private sector as mentioned earlier, include:

(a) Tax holiday on Business Profit Tax for a period of five years to be calculated from the date of commencement of production and for a second five years if annual profits are equal to or less than 10 per cent of the assets. A third five-year exemption will be granted depending on the amount of capital expansion the enterprise has undertaken.

(b) Liberal depreciation allowances based on replacement values of up to 175 per cent of cost. With additional allowances for multiple or triple shift.

(c) Full exemption of duties on imported inputs and of excise taxes on domestic raw materials.

(d) Reduced charges for land, power and transportation.

(e) Guarantees against nationalization.

(f) Guaranteed repatriation of profits and original capital investments for foreign investors.

(g) Protection against competing imports through tariffs restriction.

According to this new Act, machinery, equipment, spare parts, raw materials and quasi-manufactured goods are fully exempted from custom duties provided that these items are not available locally. To encourage export oriented industries, the Act allowed repayment of any custom duties or excise duties paid by any enterprise for raw materials and packaging by the enterprise in exports. The Act is also very explicit regarding protection given to locally produced products. It states "for the purpose of protection of Sudanese industrial products which meet wholly or partially local needs ... , the Minister shall take all legal measures necessary for raising customs duties on imported commodities."

What is really new about the Act is that enterprises set up in rural areas will be granted preferential facilities, including the obtaining of finance from the Industrial Bank of Sudan and other financial institutions. This provision did not appear in the 1956 or 1967 Acts.

Undoubtedly, the above measures enhanced the industrial sector, as its contribution in the Gross Domestic Product rose from three per cent in the early Sixties to 9.4 per cent in 1977/78[11]. However, between 1970/71 - 1974/75 its contribution to total economic activity declined below the level of 69/70 (table 7-5). This was attributed to many factors, chiefly the bottlenecks in the economy (transportation, power, water, managerial skills, skilled labour, foreign capital, domestic resources) as well as under-utilization of capacity which is still a striking problem.

The spatial effects of the advantages and guarantees to industrialists is the concentration of big enterprises in the major urban centres as they offer a relatively developed infrastructure, large markets, as well as the fact that it is only in these centres that inputs can be readily imported and from which products can be economically distributed. The development of small and medium scale private industry as well as their distribution have not been helped much by the incentive policies. These two scales of industry are up against the following difficulties:

(a) insufficient regional planning;

(b) narrowness of the local market due to generally low incomes in the Sudan;

(c) insufficient infrastructure;

(d) lack of funds, especially in foreign currency;

(e) lack of access to and advice on the operations of development and finance institutions;

(f) shortages of technical and management skills;

(g) competition with better paid and less risky economic activities, such as trade and construction;

(h) problems of obtaining permits from the Ministry of Industry on the grounds that there is under-utilization of capacity. the Ministry of Industry, for example, does not grant permits to industrialists who would like to build soap factories anywhere in the Sudan as all the soap factories are extremely under-used and if they are working to their full

Table 7-5

Contribution of the Industrial Sector

to Gross Domestic Product Between 1969/70 - 1976/77

	69/70	70/71	71/72	72/73	73/74	74/75	75/76	76/77
Total Industrial Production	107.6	108.9	76.8	82.9	111.3	142.9	167.2	195.6
Gross Domestic Product	1143	1199	832.4	896.8	1246.2	1516.8	1776.9	2091
Contribution of the industrial sector to Gross Domestic Product percentage	9.4	9	9.2	9.2	8.9	9.1	9.4	9.4

installed capacity, production is more than enough to cover national requirements. But no account is taken of the fact that there is an almost constant lack of these products in certain regions because of distribution difficulties.

7.3 The Planning Task:-

In the previous section we have discussed two forms of government intervention in influencing industrial dispersion and promotion of industries relying on the use of local raw materials. These were particularly clear in direct public participation in industry and the policies and institutional assistance designed to encourage private investors.

A third form of government intervention has been evident in economic planning. Three major questions are of particular interest:

(a) Firstly, what is the system of economic planning, and how does the government plan?

(b) Secondly, what are the results of such a mechanism?

(c) Thirdly, what are the difficulties which inhibit the advent of planning on regional and national levels?

Without wishing to digress from answering the above questions, it is worth mentioning that classical economists and their followers argued that the free interplay of market forces, if left alone, would maximize aggregate output for a given resource mix. The

"market" is therefore described as the most efficient planner; and the government is assigned the role of creating a congenial climate for the free interplay of competitive market forces. To allow the direction and rate of development to be fully determined by the market mechanism, a set of initial assumptions emerged; chief among them are (i) perfect information to all producing and consuming units, (ii) mobility of factors of production, (iii) the infinitesimal and divisibility of these factors, so that none by itself can affect the market. Alas, it is all too apparent today, that this theoretical framework is much too general and much too simple to serve as the sole guide for allocation of investment among the different economic sectors. For a country like the Sudan, the mechanism cannot operate in its expected efficiency, not only because the above assumptions do not hold, but also because there are obstacles to development beyond the reach of the price mechanism, which call for government intervension. To mention a few, the transport bottleneck, political uncertainty and shortages of domestic resources jump to the forefront.

To make everybody better off, economic planners nowadays are concerned more about distribution of economic growth, rather than its pace. It is true that the fastest possible rate of economic growth may not be felt by the majority of the people. Indeed, this is consonant with what Robert McNamara, the President of the World Bank, put assiduously in his address to the Board of Governors in September 1974, that "40 per cent of the population in every developing country are neither contributing significantly to their nation's economic growth, nor sharing equitably in its economic progress."

Such fiasco in providing the basic needs to the alienated segments of the population calls for government intervention with deliberate plans and policies to influence the quality and distribution of economic growth. There is even a strong tendency among governments of developing countries today, to improve the levels of living and minimize, if not eradicate, regional disparaties and inequalities among social and ethnic groups. It is not surprising, therefore, to see that the challenge for solving the problems of the past, and facing the increasing turbulence in the economic and social scenes triggered the conscious efforts, comprehensive and centralized planning in the Sudan during the last two decades.

However, these efforts have been impaired by the frequent political changes in government structure, grouping in governmental functions and senior personnel. Moreover, little attention has been given to the process of filtering down of the basic information required for economic planning. This has not only made it difficult to work out a long-run development strategy, but has also resulted in ineffective use of resources. The planning machinery has also been subjected to changes and instability in its status, as we shall see below.

7.3.1 The Planning Machinery:-

Planning machinery and planning procedures have been the target of frequent revisions, as the instability of different regimes, and even changes in ministerial portfolios within the same regime, often stimulated such changes. Before 1946 allocations for social and administrative services were budgeted for and administered by the Expenditure Section of the Financial Secretary's Office of the

colonial administration. The budget had to be approved by the Financial Secretary and finally blessed by the Governor General. There were no long or medium term plans, nor were there a frame of priorities.

Dissatisfaction with the above situation led in 1946 to the formulation of the Development Priorities Committee under the chairmanship of the Financial Secretary. It was charged with the functions of determining priorities and the viability of proposed development projects. Execution of these programmes was left to the expenditure section of the Finance Department. However, in 1951 this responsibility was delegated to the Development Branch within the same department under the leadership of a Commissioner for Development.

Shortly after independence a Ministerial Development Committee was formed by the first national government. The new membership of the Committee consisted of the Minister of Finance (as Chairman) and the following ministers:- Irrigation, Health, Education, Transport, Public Works and Industry and Supply. Its basic functions were twofold:- (a) The first was to examine development projects initiated by heads of departments, and select those which were most suitable with regard to the financial capabilities of the country as well as natural resources. (b) The second was reviewing periodical reports on the execution of approved development projects. Perhaps the experience so far could be described as some form of central planning; however to some[12] the whole exercise was simply a list of projects initiated by heads of departments without any connection or general objectives.

The military regime of 1958 kept the Development Committee with almost the same membership and functions. But it formed an Economic Planning Secretariat and entrusted it with the task of preparing a comprehensive plan of economic development. Ministries, departments and statutory corporations were requested to draw up their development projects on the basis of the broad objectives and guidelines approved by the Ministerial Committee. The Secretariat analysed the proposals and subsequently drafted the first Ten-Year Plan, which represented an important landmark in the history of comprehensive national development planning in Sudan.

Following the collapse of the military government in October 1964, several political parties came to office; but none stayed in office long enough to formulate a plan. This resulted in a very fluid planning organization at the political level; however, the planning machinery at the civil service level gained momentum as the small Development Branch created in 1964 has grown into a full Department of Economic Planning, headed by an Under Secretary in the Ministry of Finance.

In May 1969 the military again assumed power. The new regime introduced changes into the planning machinery which affected both its constitution and functions. For the first time, planning was brought to the forefront of the economic scene as a necessary prerequisite for the foundation of a socialist society which was propagated in order to mobilize support for the new government. A fully-fledged Ministry of Planning was created and hence for the first time, development policy was separated from the Ministry of

Finance. Its main function was to take the responsibility of comprehensive planning and follow up together with the help of the planning units in ministries and corporations. As the regime at that time enjoyed a close association with the Eastern Bloc, a team of Russian experts helped the newly elevated planning authority to prepare its major first task - the Five-Year Plan, which was launched in 1970.

Three years after the inception of the Five-Year Plan, drastic changes in the planning organizations were introduced as part of the changes which occurred within the executive organ. A Supreme Planning Council was formed to provide preliminary directions for planning under the chairmanship of the President of the Republic, and included the following as members: (i) Deputy Vice President, (ii) Chairmen of the Ministerial Councils for National Economy, Natural Resources, Human Resources, Rural Development, (iii) Ministers of Foreign Affairs, Public Service and Administrative Reform, and five other ministers dealing with major economic and services sectors to be appointed by the President. The Ministry of Planning was abolished and replaced by the National Planning Commission which acted as a technical body for the Supreme Planning Council. Its main functions were (a) to plan the development budget and approve its financing; (b) to negotiate and contract foreign loans; (c) to co-ordinate and follow up performance of sector plans. The Commission was headed by a Commissioner of Planning, who enjoyed a subministerial level and acted as secretary to the Supreme Planning Council.

Ostensibly, this looked to be a high-powered central planning body;

however, the facts of the situation, as put by one senior government official, were different. As in the absence of the President of the Republic, the Minister of National Economy presided over the Supreme Planning Council, and since the Commissioner of Planning was a junior minister, the National Planning Commission shrunk, de facto, to the level of a department in the Ministry of Finance. This situation did not last long as in April 1975, the President decided to transfer the powers of the Supreme Planning Council to the Council of Ministers and to elevate the job of Commissioner of Planning to a full ministerial status.

It is quite evident from the above that a lot of shifts have taken place in the planning machinery. The aim of the moves has been to create a stricter Central Control with respect to planning and securing the financing with a strict follow-up of expenditure on the plan. Ministries and corporations have their own planning sections which concentrate mainly on the technological aspects and details, suggesting programmes and forwarding information to the Planning Commission. The Commission therefore, with the planning bodies of the different government departments, is now the technical body entrusted with working out the plans, whether five-year or annual, according to the objectives and priorities set out by the Council of Ministers.

There is another political dimension to the process of planning, as different political organizations, rallying under the slogans of expressing the people's wishes and desires, exert influence on the decision making process. The Sudanese Socialist Union (S.S.U.) is now the only centre of political activity in the country. It is

supposed to be an alliance of the five "peoples' working forces", namely workers, peasants, the armed forces, intellectuals and national capitalists. The major policy-making bodies within the S.S.U. are the Annual Convention, the Central Committee and the specialized secretariats. All the peoples' working forces are represented in these bodies, albiet workers and peasants have the lion's share. According to the Constitution of the S.S.U. at least 50 per cent of the membership of every organ should be alloted to the later forces.

Despite the above alliance, the degree of participation by the forces in the planning process have also been changing. As the regime at the outset adopted "a socialist and anti-imperialist line" workers organizations enjoyed a close association with the government and consequently played an active role in the discussions of the Five-Year Plan. Employers (known as national capitalists) did not enjoy the same degree of association as workers and thus their role was minimal. The situation now is reversed, as the government treads a more pragmatic and open economic policy. Thus the political environment is congenial for employers to play a key role in the planning process through their representation in the organs of the S.S.U., their access to political leaders, and their contribution on ad hoc government committees. More importantly, economic decisions of far-reaching implication, such as the final adoption of the plan, are often in the hands of the President.

7.3.2 Development Plans:

Development programmes, per se, had been tried first in 1946. An investment plan for five years amounted in investing LE 13.8m.(13)

This was followed by another programme for 1951-1956 with an estimated expenditure of LE.33.9m[14] allocated among the following sectors:

Communications	LE. 9.26
Production	7.84
Public Utilities	5.10
Health, education	6.90
Administration	4.80

It is clear from the above figures that the objectives of these programmes were to enhance the production of cotton, and provide public services, such as the expansion in the fields of education, health, and civil service. Between 1956 and 1960 only development budgets were prepared on an annual basis, with no serious attempt to draft a long-term comprehensive plan. All the programmes up to 1960 were nothing more than a collection of development projects without any underlying themes or defined targets joining them together. There was no problem of finance, rather, the main bottle-neck arose out of shortages of manpower, mainly professional and technical, for the survey, design and execution of the programmes. To encourage foreign investment in participating in development programmes, the first national government declared clearly that it "would do everything in its power to maintain public security and foreign business and proceed with confidence."[15]

By the early Sixties, the government became aware of the need for a comprehensive national development plan, and to this end formed the Economic Planning Secretariat in the Ministry of Finance, entrusted with the task of preparing a comprehensive plan of

economic development. The time horizon was set first as a seven-year plan, then extended to a ten-year plan because the Roseires Dam, a key multipurpose project of the plan, required ten years for its completion.

The plan was comprehensive as it accounted for shares for both the private and public sectors. Total investment was planned to amount to Ls 565.4 million out of which public sector investment was Ls 337.0 million and private sector investment was set at Ls 228.4 million, a share of 59.6 per cent and 40.4 per cent respectively[16]. The main objectives of the plan were as follows:-

(1) An increase in real per capita income through a satisfactory growth of the total national product.

(2) Broadening the structure of the Sudanese economy.

(3) Increase in exports and imports substitution.

(4) The maintenance of a stable price level.

The plan was criticised on a number of counts. Firstly, very limited studies had been made by the government units or the planning secretariat. Secondly, scarcity of data in the Sudan made the task even more difficult. "The Minister of Finance and Economics in his broadcast on the occasion of the presentation of the plan recognized such a problem and the difficulties it makes in the face of planning in the Sudan."[17] Thirdly, the plan was confined to the modern sector of the economy with little attention paid to the traditional sector.

After the first four years, the gap between the plan and the actual

outcome became very serious, and the new government which assumed power in October 1964 decided to abandon it. However, with all its limitations and shortcomings, the plan stressed the importance of planning as the main pillar for development. As regards industry, the plan allocated Ls 106.9 million with Ls 65 million and 41.9 for the shares of the public and private sector respectively (see table 7-6). Recognizing the importance of transportation in economic development, the plan earmarked Ls 95 million for this sector. The amounts set for infrastructural services indicate the awareness of the government of the importance of such facilities for economic development in general and manufacturing industry in particular.

Table 7-6

Project Investment for the Ten-Year Plan by Major Sectors (Ls million)

Sector	Public	Private	Total	. %
Agriculture	90.1	30.0	120.1	21
Industry	41.9	65.0	106.9	19
Transport and Communication	63.0	32.0	95.0	17
Social Services and General Administration	90.0	60.0	150.0	27
Total New Investment	285.0	187.0	472.0	84
Replacement Investment	52.0	41.4	93.4	16
TOTAL INVESTMENT	337.0	228.4	565.4	100

Source: Government of Sudan, Ministry of Finance and Economics "Ten Year Plan of Economic and Social Development" 1960/61 - 1970/71, Khartoum.

In 1970, the 'May Regime' launched its first Five-Year Plan for economic and social development 1970/71 - 1975/76. It was aimed to increase the GDP at an average rate of 7.6 per cent per annum. The total amount of investment was estimated to total Ls. 385 million over the period of the plan, of which Ls 215 million was to come from the public sector and Ls 170 million was to be allocated to the private sector. The other major objectives of the plan were[18]:

(1) To achieve an increase in commodity production, both agricultural and industrial.

(2) Implementation of an elaborate programme of public capital outlay for development, Ls 215 million as against Ls 137 million in the previous years.

(3) To promote prosperity of the people through the growth of productivity, realization of full employment, enhancement of the employee's skills and capabilities and the expansion of public services and other related activities.

To enable the achievement of these objectives, all sectors of the economy were synchronized. The Ministry of Planning demanded that all ministries and other government units co-ordinate their efforts and supervise the various aspects of their sectoral activities during the process of implementation. For the industrial sector, the plan envisaged an increase in volume of industrial production by 57.4 per cent, the adoption of new production methods and techniques for the increase in production to meet local demand, and the execution of a comprehensive investment programme in the public sector. Ls 60.4 million was earmarked for

the development of the industrial sector with Ls 36.4 million and Ls 24 million for investment in public and private sectors respectively.

However, on the basis of the changing domestic and international political and economic environments, it became clear that the level of investment in the industrial sector would not satisfy the aspiration of rapid socio-economic development, and thus it became necessary to adjust the plan. As a result, in early 1973, a Phased Action Programme was superimposed on the Original Plan, extending it to 1977. Special increase was allocated to the industrial sector, precisely raising its share to Ls 323 million. This represented 540 per cent over the Original Plan forecasts, which was in part due to the inflationary increases, but mainly resulted from inclusion of new projects.

The amended Seven Year Plan was followed by the present Six Year Plan for economic and social development - 1977/78 - 1982/83. Its aim for the industrial sector is the completion of the projects which are under execution and carried over from the Phased Action Programme. In addition to the ongoing projects, the Plan has made allowances for new projects. The emphasis is on agro-industries utilizing local raw materials, chiefly sugar and textiles. The plan has also given special attention to export-oriented industrial production. In order to further the participation of local and foreign investors in the industrial investment, the plan emphasised the following policy measures: Firstly, expansion of industrial credit; secondly, promotion of industrial legislation and reviewing the measures which stand against the private, local and

foreign participation; and thirdly, encouragement of local industries through tax concessions and tarrif protection[19].

The implementation of the Six Year Plan coincided with a growing deficit in Sudan's foreign exchange. This had been due partly to inflationary trends in the world and the increase in the price of manufactured goods and oil - of which the Sudan is a net importer - and partly to an ambitious development plan, the cost of which soared far beyond expectations. To face the situation, the government introduced in June 1978, the Stabilization Programme which aimed at correcting internal and external embalances in the economy.

The major implication of the above on the public industrial sector was the reconsideration of the new projects and concentration on implementing the on-going ones. Later the Six Year Plan was sliced by about 50 per cent which is severe, but makes it more realistic.

Difficulties of Planning:-

Considering the above development plans and the preceding analysis of the planning machinery, one may infer that planning in the Sudan could only achieve moderate success due to several problems that impeded its advent. These can be summarized in the following:-

(a) At the present time, planning appears to be a highly centralized job carried out at the centre without any recourse to the other regions, except for the South. Following the 1972 Addis Ababa Agreement which put an end to the 17 Year War in

the South, decentralization to the regional authorities has been agreed and the prime responsibility for development planning, plan implementation and the provision of public services rested with the regional government. Albiet there is a little evidence of a similar transfer to other provinces. The tendency to take decisions from the centre inhibited local authorities from being placed in a position where they are physically, administratively, and financially able to draw and execute development schemes. Even expenditures to provincial authorities have been allocated either to historical reasons or political pressures exerted by people or units involved in the decision making process.

(b) The second problem is that the fluid political situation impaired defining clear strategies for the government and the country's development. Sudden changes in direction in economic policy is the rule, rather than the exception. This is due to the frequent changes of ministers and senior personnel. It would have been more appropriate to formulate generally acceptable strategies and define targets which would not be changed as a result of changes in economic philosophies.

(c) The shortages of technical staff made the construction of plans an academic exercise by foreigners. Scarcity of trained personnel is a

problem which is common to most developing countries; and Sudan is no exception. The Ten Year Plan, for example, was prepared by Western experts and was written and printed in English. Although it was mentioned in the introduction of the plan that efforts were made for widespread understanding and participation by the people, one wonders how many citizens have ever read it. The present government tried to enlist the goodwill and co-operation of the 'peoples working forces' in the preparation of the Five Year Plan; but the effectiveness of such co-operation remained to be ascertained. The fact that the plan was actually prepared by a team of Russian experts who experienced difficulties of communication with their counter-parts makes it doubtful whether the resolutions and discussions were considered by the planner or not!!

(d) The allocation of functions among ministries is not conducive to a co-ordinated and planned development effort. More than one ministry is involved in a number of sectors.

(e) Finally, needless to ascertain that the planning process can be no better than the statistical base on which the plan is formulated. The present statistical organization in the Sudan is weak. Government units do not bother producing statistical figures, and when they do, the figures

are contradictory and mostly sporadic. For example, both the Central Bank of Sudan and the Department of Statistics publish trade statistics which differ by substantial amounts in total and for major individual items. There is an urgent need to upgrade and strengthen the Central Statistics Department so as to be the major reliable producer of statistics for the government and its agencies.

7.4 An Operational Approach for Government Policy Towards Location of Industry

So far, we have been examining the different forms of government intervention in the industrial sector in the Sudan and giving special place to the spatial aspects of such policies. Hitherto, the Sudanese government has been basically concerned with building a manufacturing sector per se, rather than influencing the location of investment decisions to cater for the regional disparities which are now a striking feature of Sudan's economy. Government policies have been influenced, to a large extent, by the frequent political changes which resulted in a very fluid planning organization. Despite the efforts, industrialization has not met the aspirations expected. Moreover, those were encouraged by the incentives offered opted for a dual course of action. Firstly, they established their enterprises in the few major urban centres of the country, namely Khartoum, Khartoum North and Omdurman. Since the different Promotion Acts treated industrial growth in all regions of the country equally, and there is a comparatively developed infrastructural facilities in these centres, besides the fact that all industries are market

oriented, we should not expect otherwise.

Secondly, due to the absence of a clear industrial strategy, they favoured import substituting industries and sometimes produced non-essential products of low quality and high cost. A more wise policy would have been the curtailment of infant industries depending on government protection and financial incentives and promoting as far as possible, export-oriented industries. Processing of gum arabic and exporting it tinned, as well as spinning, are two examples of industries using local raw materials with better prospects than import-substitution industries. Moreover, they are not constrined within the narrowness of the local market.

Another weakness hampering the effectiveness of incentive policy results from lack of the basic infrastructural facilities outside the major urban areas - power, water, transportation, skilled labour, etc. Removal of these obstacles will surely be a positive impetus for the development of the industrial sector and the national distribution of economic activities to the different regions of the country.

It is also imperative to mention that the different development plans ignored regional development planning. The outcome of this was the lack of proper utilization of the economic characteristics and potentials of various regions.

What Sudan needs most, and lacks at the moment is the realization that special attention should be given to regional development planning on the grounds that the development of the human being,

raising his welfare standards, and the achievement of social justice in its wide sense constitutes the backbone of the plan's strategy. It is high time that the government reviewed its locational policies and took measures to influence industrial location. In all fairness some of the government-sponsored projects which required large amounts of capital were established in less developed areas and consequently contributed to their growth. However, their scope was limited by physical, technological and other economic considerations; and hence development of the area has been adopted as an added bonus where alternative sites were available.

In this connexion, with locations of consumer goods, a policy of dispersal is possible. Although many investment opportunities exist in areas outside the major urban centres, such ideas are still at the embryonic stage for two reasons. Firstly, detailed verification of market demand and the availability of key inputs and data on capital and operating costs are usually lacking. Secondly, the situation is further complicated by a lack of information on existing small industries in the context of the national plan. So the government could assist people living outside the major urban areas in sponsoring technical studies with respect to three principal types of industrial projects:-

(1) Small and medium scale agro-industries, including livestock processing[20]. Such industries offer a means to increase local value added, create local employment and often closely related to basic agricultural production. If the benefits of proper planning of industrial location are to be widely spread, small and medium industrialists

should be encouraged and helped with supporting services. Above all, they must not be deprived of the capital they need because large projects elsewhere are allowed to absorb the limited resources available.

(b) Provision of basic consumer goods required in the vast rural areas of the country, such as dairy products, bakeries and soft drink and furniture. The importation of thousands of tonnes of dairy products and foodstuffs annually is a reflection of the gap that exists in these segments of industry in the Sudan.

(c) Handicrafts: The craft industries in the Sudan, have for a long time suffered as a result of lack of access to commercial credit, declining technical skills in the face of competition from alternative sources of employment and difficulties of marketing. Most craftsmen operate either independently or as small employers. They often express a wish to preserve traditional skills, but also recognize the need for modern tools and equipment to raise their productivity and lower their costs. Therefore, it becomes important to establish 'machine service centres' either on a co-operative basis or under regional and local authorities, where major items of equipment such as lathes and power saws could be installed and hired to craftsmen on a time-sharing basis. In

addition, technical assistance is needed to improve the quality of design, establish simple accounting systems and, in a few cases, to assist in marketing.

Our need for rural development does not mean that we are advocating total dispersal of industrial location for its own sake; rather seeking a flexible approach which draws attention to two important aspects of planning of industrial location in the Sudan. The first is the development of industrial centres in areas suitable from an economic point of view, with comparative advantages of electricity, good supply of water, transportation, etc, which the government could improve without incurring heavy costs. The country is known for its vast size and great physical, human and social diversity. Each province has its own special features. At present there exists a relatively privileged axis along the Nile and its tributaries, where population density is higher and development relatively advanced. As soon as one moves away from this axis, there are areas which are less densely populated, with a few isolated poles of development that are basically the commercial and government centres of the provinces. In the far North, for example, the entire population is concentrated along the Banks of the Nile since the rest of the countryside is desert. Any attempt to develop any industrial centre would require expensive infrastructure beyond the reach of the country's scarce resources. In addition, one of the major obstacles to development is the lack of labour, since many workers prefer to work abroad.

In the South, however, the valleys are vast marshlands, hardly

areas for people to settle; the population is less concentrated around the Nile and its tributaries. However, political considerations make this region of particular interest. The region is the least privileged one in the country, and the battle cry which resulted in the war that claimed many lives, was for more development and a fair share of the national cake. Therefore, in the policy of industrial location, the prime objective should be to seek all opportunities to create new jobs for the unskilled and semi-skilled people. This can be directed by (a) dispersal of industry and its location in provincial areas of the region; (b) promotion of industries using unskilled and semi-skilled labour both in the public and private sectors with the extension of in-plant training; (c) implementation of labour-intensive technology in the newly established units if it is justified from the economic point of view, and technological requirements; (d) development of small-scale and medium-scale industries and promotion of handicraft and traditional industries by all means available.

The East has relatively good infrastructure and great agricultural potential that is already partially developed. In the West, the rational development of livestock and the crops in the Jebel Marra region should make it possible to set up processing plants consistent with regional plan objectives.

Of course, for a more effective use of incentive policy, concessions should be given or geared towards industrialists who move to these centres. This will ensure that enterprises to priority areas will be receiving more assistance than those who opt to remain in major urban centres. Incentives could take the form of loans given by the

industrial bank on reasonable terms, tax holidays, protection through tarrifs, exemption of custom duties, etc.

This will take us to the second aspect of the locational strategy. Development of the above centres should not inhibit development of small businesses in the rest of the rural parts of the Sudan where at least 80 per cent of the population live. So difficult, yet so important, are the problems of making a positive impact in the lives of those living in rural areas; that makes one to believe firmly that the institutional framework should channel more capital to the rural sector. Moreover, there is a need for the expansion of the activities of small industrialists in rural areas, many of whom would be setting up business for the first time. If the benefits of industrialization are to be widely spread, small industrialists should be encouraged and helped with supporting services. As time passes, one expects that handicrafts and small industries in rural areas will be of increasing importance and act as focal points for the future development. This will help arrest the migration of people from the backward regions to the major urban centre through creation of employment opportunities and improvement of living conditions. Consequently, the inducements that pull people to the cities are less effective.

7.5 Summary:-

The chapter takes up the role of the government in influencing the investment location decisions. Answers were sought to the following questions: (1) What are the main forms of government intervention? and what are the key policy reforms required to correct the present locational maladjustments.

Regarding the first question, government intervention has been evident in three main areas: (a) direct State participation in productive activity with the State as entrepreneur; (b) policies and institutional assistance designed to encourage private investors; (c) intensified efforts at economic planning.

Modern industrialization started in the Sudan after independence in 1956. The main aim of the government was the development of the industrial sector. The locational impact of the early policies was to encourage the location of the industry in the very few urban centres. This virtually left the rest of the country without any industrial base. In 1961/62, a Ten Year Plan was launched, representing the country's first attempt towards comprehensive economic planning. This was followed by another two plans. However, these efforts have been hampered by the frequent political changes in government structure and government personnel. Consequently economic philosophies change every now and then. Little attention has also been given to the process of providing the necessary information required for economic planning which made it difficult to formulate long term strategies, as well as resulting in ineffective use of resources.

To help and encourage the private sector, the government issued a number of Acts which provided several important concessions. However, neither these Acts, nor the above plans seem to have been concerned with rural development as a desirable national objective.

For a more rational and operational approach to the planning of industrial location in a country like the Sudan, the government

besides participating in the industrial sector, must provide the necessary infrastructural facilities which are important prerequisites for any future industrial development. Taking into consideration the size of the country (one million square miles) it is impossible in the short-run for the government to provide a good system of transportation, communication, power supply, clean water, educational base for the entire country; and to distribute industry evenly in all provinces. This particular situation calls for a flexible approach to the problem; and hence attention must be given to the following two aspects: (a) creation of industrial centres in areas suitable from an economic point of view, with comparative advantages of electricity, water, transportation, etc. The government here is required to consolidate and improve as much as possible the existing facilities. (b) To cater for the wide rural regions of the country where 80 per cent of the population live by channelling money and helping the private sector in establishing small industries and handcrafts which will be the focal points for future development. Such policy if being implemented will help to arrest the migration of people to the major urban centres through the creation of employment opportunities and improvement of living conditions.

CHAPTER EIGHT

CHAPTER EIGHT

LOCATION DECISIONS:
THE KENANA SUGAR COMPLEX

8.1 Introduction

In this Chapter we will undertake a detailed analysis of how and why the decision was made to locate the third largest sugar project in the world in Rabak area. The chapter is concerned with identifying the decision making process regarding the location of the Plant. The discussion of the issues involved is based on the last three chapters, and thus it can be seen as an attempt to pull threads together for the purpose of showing the place of location decisions within the dynamic process of planning that goes in the Sudan.

We have elected to split the decision process into four main parts. First, the threshold of the decision process. We have already argued that the main thrust of development will be made in the agricultural sector of the economy. After centuries of poverty with little hope of economic miracles, Sudan's economic salvation could be in sight. Like Britain's North Sea Oil, Sudan has an untapped asset - 200 million acres of rich land. Moreover the agricultural sector contributes about 40 per cent of the country's gross domestic product and constitutes over 95 per cent of its exports. It accounts directly or indirectly for over 50 per cent of government's revenue and provides employment for about 70 per cent

of the work force.

The above picture is likely to remain so for several decades to come. It is not surprising, therefore, that the heart of the government's strategy for economic and social development depends on exploiting the agricultural potentialities of the country in the most productive way. This will be supported by complementary developments in other sectors of the economy.

Acceleration of the industrialization process will certainly take place in the future and will contribute increasingly to the modernisation of the economy, but the potential for agricultural development is so great that agriculture will almost certainly remain the dominant sector of the economy. Needless to say, industry needs to be in a position to support activities elsewhere and to exploit those opportunities where it has a clear compatative advantage. There is good reason to believe that the processing of agricultural products offers sound industrial prospects. This being the case, major decisions have been taken to expand the production and refining of sugar to meet local demand as well as exporting to Arab and African markets.

The environmental influences on government planners arising from internal pressures (problems of poverty, underemployment, balance of payments problems, domestic regional disparities and increasing domestic demand for sugar) and external opportunities (exporting sugar to Arab and African countries) combine to produce the threshold for the decision making process. This resulted in a constant flow of information. The process of gathering, sifting and evaluating

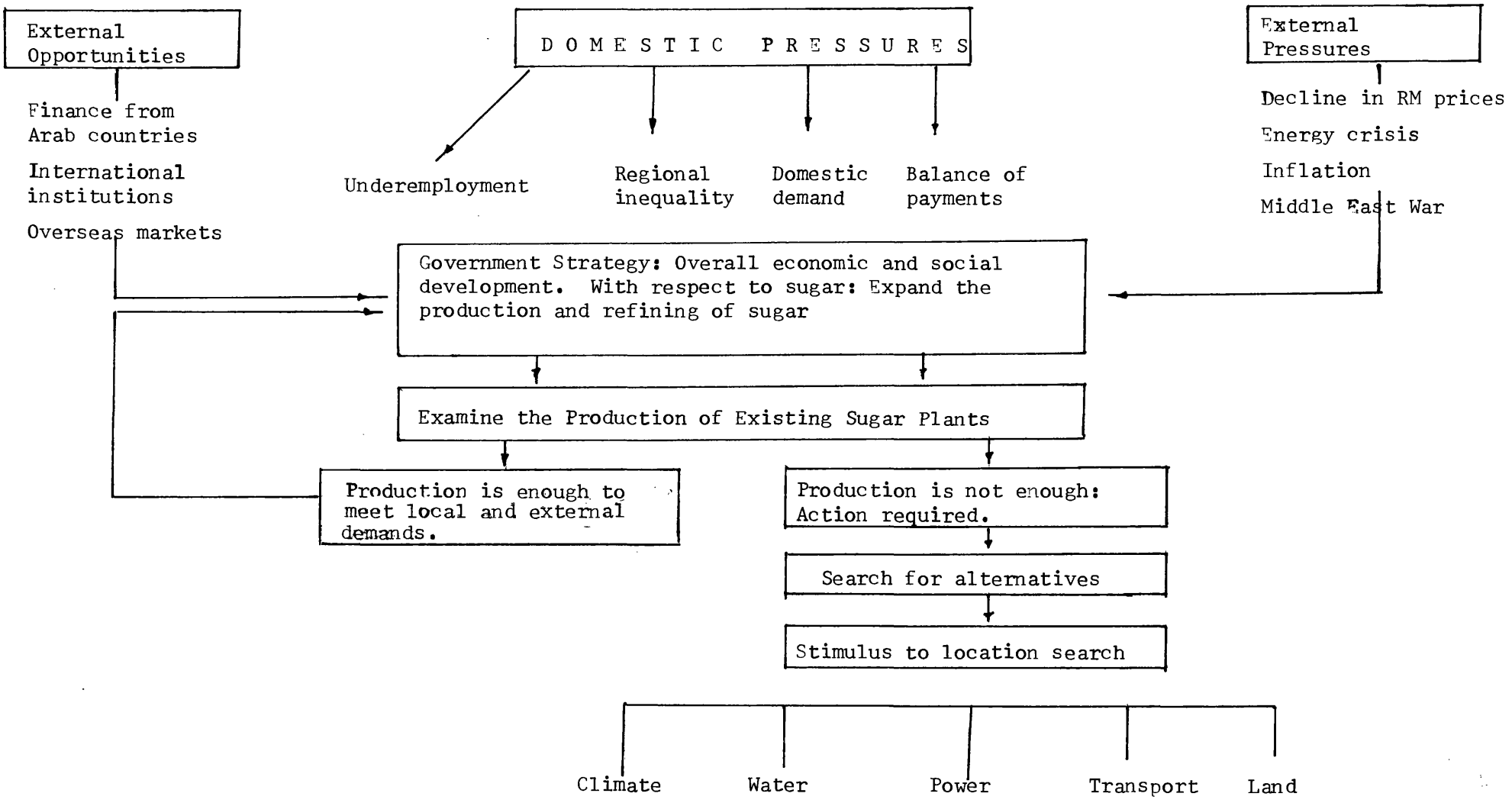
information constitutes the second stage. The work reported in the last three chapters will be utilized as a platform for analysing the locational aspects considered important for this particular project. These include climate, water, soils, transport, power, availability of sufficient land and consideration of alternative sites. It is clear that stages one and two of the decision are mainly concerned with providing information relating to the nature of the problem.

Figure (8-1) depicts these two stages and shows the range of pressures and opportunities which arise from both internal and external environmental sources. The early 1970's witnessed the largest and most severe world recession since the Second World War. The recession struck with full force in 1974 in the developed countries following the sudden sharp rise in the price of oil. The rising inflation, and declining returns on capital added to the gravity of that distortion. The subsequent process of recovery has been slow and tentative, and the rate of inflation in many of the developed countries has decreased from the peak of 1974; however those rates are still on the high side. This accordingly lays a negative impact on the developing countries which have to meet their rising bill of imports from the developed countries; both consumer and capital goods. The developing countries are further affected by the declining international prices of the raw materials they produce.

The Sudan, like other developing countries, had a lesser effect on the turn of events, and hence suffered from the above adverse conditions. Internally the country was, and still is facing a lot

Figure 8-1

Stage (1) and (2) of the Decision Process



of difficulties - underemployment, inflation, regional inequality, increased demand for consumer goods, and balance of payment problems. The option opened to the government was to undertake all the necessary measures and actions which should help in combating these problems. To Professor R E Thomas[1]

> "The fact that government has to take account of such elements as the country's balance of payments and the external purchasing power of its currency adds to the likelihood that the government will seek to regulate the level of Economic activity by continual adjustments - the so-called 'instant tuning' of the economy."

Stage three, which evolves out of stage two, is concerned with the location decision. This involves defining the site as well as establishing all the parameters of the project. The fourth and final stage is the implementation and evaluation of the decision.

There are a number of reasons for considering the location decision as a dynamic process rather than a fixed procedure or a choice made at a particular point in time. Firstly, the character of the decision which ultimately leads to the establishment of a new plant is basically non-routine and non-recurring, with a good deal of uncertainty associated with the outcome. As such, the decision to establish such a sugar plant (which is now rated number three in the world) necessarily requires following the full decision making process, and is normally accompanied by a wide-ranging reappraisal of all the parameters of the chosen project. Secondly, by splitting the decision process into stages, analysis can be made of the important influences of each stage of the decision process.

Thirdly, the structure of the decision is very complex and often throws the decision taken into an unaccustommed situation. Consequently, one cannot resort to a suggested frame of reference as is the case with more routine decisions.

Ansoff[2] identified three types of decision - operating, administrative and strategic. To him, the operating problem is concerned with getting as much performance as possible out of the company's investment in current markets - a process similar to "seeking the best way to milk the cow". Strategic problems are concerned with allocating the firm's resources to activities which offer the largest potential return, which may not necessarily have anything in common with its current activities. Thus the location decision may be seen as a strategic decision, as strategy is very much a question of choice from the alternative paths open to the company.

Many writers in decision theory have advanced different ways of classifying decision. Simon[3] has referred to programmed and nonprogrammed decisions. "Decisions are programmed to the extent that they are repetitive and routine ..... Decisions are nonprogrammed to the extent that they are novel, unstructured and consequential."

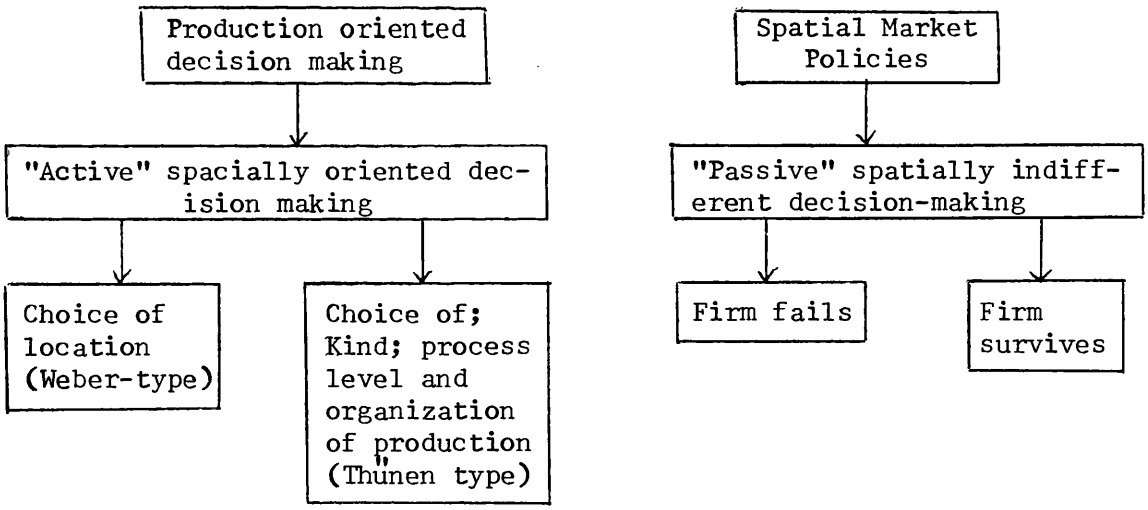
Another distinction similar to that of Simon has been made by Drucker[4] but he labelled programme decisions "generic" and nonprogrammed decisions "unique".

An interesting discrimination has been advanced by Krumme[5] in his conceptual framework of location decision making alternatives (Figure 8-2) when he separates "active or spatially oriented

decision making, from "passive" or spatially indifferent decision making. "At one extreme, all entrepreneurs adjust perfectly to their economic environment, pursuing spatially oriented decision making. On the other extreme, entrepreneurs are spatially indifferent, the spatial implication of their decisions - including the choice of the production programme - being a pure accident, ... only those firms seem to remain in existence in the long runwhich either had been located correctly by accident or which successively become spatially conscious and adjust by changing kind, process, level or organization of their activities."

Figure 8-2

Process of Spatial Behaviour of Firms



Source: Kurmme, G.

It is essential for decision takers to understand the nature and the structure of non-routine decisions, "It is precisely this type of nonprogrammed decision making that forms the basis for allocating billions of dollars worth of resources in the economy every year."(6) Moreover, the context is in itself continually undergoing modification

as we are living in a turbulent environment, the decision of a new location, being a non-routine decision, will involve a high degree of undertainty for the decision takers. Three types of uncertainty have been distinguished[7]. Firstly, uncertainty in the knowledge of the external environment; secondly, uncertainty about the appropriate value judgements to be used, and thirdly uncertainty as to future intentions in related fields of choice.

It is assumed here that decision makers entrusted with the location choice have to work in the realm of uncertainty, ie, there is an element of doubt about the success of a given locational decision. According to Cohen[8] under conditions of uncertainty, people seek refuge in the safety of figures. An entrepreneur faced with the problem of choice between two sites with identical percentage success frequencies, but with one site having more population, is likely to select the one with the larger population. Cohen's findings are crucial as they suggest that concentration of activity can be attributed to normal behaviour patterns.

Three concepts of paramount importance emerge at this stage. (a) the location decision is seen as part of a process that deserves all the time and attention that can be devoted to it, (b) the decision makers must take account of the inputs of the environment (internal and external), and (c) there is always the element of uncertainty. Subject to the above, we can single out the four stages for the locational decision process which have been mentioned already. To clarify these stages, this chapter is devoted to the discussion of the different aspects of the decision process with respect to Kenana Sugar Project which is considered as a super deal for a developing

country like the Sudan. Accordingly, the chapter is split into three parts:

Part 8-2:- will be devoted to the first two stages of the decision. These basically discuss the threshold of the decision (internal and external environmental pressures) and the flow of information regarding climate, water, soil, transport, power, land, etc.

Part 8-3:- will be concerned with stage three of the decision, ie, the location decision.

Part 8-4:- implementation and evaluation of the decisions which constitute part four.

8.2 Stages One and Two

8.2.1 The Pressures:-

We have already shown that the agricultural sector is the most important sector of the economy and is likely to remain so in the future. In 1955/56 the share of agriculture was 60.7 per cent of the total Gross Domestic Product. The shares of (i) industry and mining, (ii) construction, and (iii) transport and communications were 4.5 per cent, 5.7 per cent and 7.5 per cent of the G.D.P. respectively (see table 8-1). The distribution of the labour force by economic sectors shows also the dominant role of agriculture in the economy. The shares of the different sectors in 1955/56 were as follows: Agriculture 86 per cent, Industry and Handicraft 5 per cent, Construction, 0.6 per cent and Transport and Communication 0.6 per cent (see table 8-2).

Table 8-1

GROSS DOMESTIC PRODUCT BY PERCENTAGE FOR THE YEARS
1955/56, 1960/61, 1965/66, 1970/71

SECTORS	1955/56 Per cent	1960/61 Per cent	1965/66 Per cent	1970/71 Per cent
1. Agriculture and Forestry	60.7	57.9	42.6	40.9
2. Mining and manufacturing	4.5	4.7	7.4	9.7
3. Electricity and water	4.4	4.2	3.6	3.1
4. Construction	5.7	6.0	5.3	4.2
5. Commerce and hotels	6.2	7.0	17.2	10.4
6. Transport and communications	7.5	7.3	7.0	9.5
7. Finance and real estate	3.4	3.5	3.5	4.2
8. Government services	6.0	7.7	9.6	15.9
9. Others	1.6	1.6	3.9	2.1
TOTAL	100.0	100.0	100.0	100.0

Sources: The Economic Surveys published annually by the Ministry of Economics and Finance, Khartoum, Sudan, for the years 1961/62 - 1967 and 1972.

The above shares of the different sectors in G.D.P. and the labour force not only show the predominantly agricultural nature of the economy, but also the backward structure of the economy and the low productivity per man in agriculture, ie, 86 per cent of labour force produced only 60 per cent of the Gross Domestic Product. Large segments of the labour force do not produce and earn enough to lift themselves out of dire poverty. People have to move long distances each year in order to raise their incomes only slightly above subsistence level; throughout the economy, productivity is below the level warranted by the nation's resource endowment.

Table 8-2

Distribution of the Labour Force by Sectors in 1955/56

	Numbers engaged (000s)	Per cent of total labour force
1. Agriculture	4,154	85.76
2. Forestry	247.7	5.11
3. Industry and handcraft	31.0	0.64
4. Construction	99.9	2.06
5. Trade	31.0	0.64
6. Transport	233.2	4.60
7. Services	62.7	1.29
8. Others	4,849.5	100.0

Source: Economic Survey of 1964, p 77. Ministry of Finance and Economics, Khartoum, Sudan.

However, in contrast to the unfavourable situation in respect of pervasive underemployment, stands the fact that open unemployment rates are appreciably low in Sudan. It is generally negligible in the countryside and low in the cities. On balance, the urban market has largely succeeded in recent years in absorbing even greater numbers of job seekers; the rate of open unemployment in Greater Khartoum is no more than five per cent, and this is partly because of turning the public sector employment into a form of substitute for employment pay.

Faced with the above constraints, the objective of the government is to achieve a meaningful improvement in the economic well-being of the Sudanese people through a broader participation of Sudanese and foreign investors. Development spending by the government in 1975 was £65 million (US $ 162.5 million). Development assistance in 1975 included loans and grants of approximately US $ 700 million from several Arab countries, US $ 60 million from West Germany and lesser amounts from other countries. The country's export earnings in recent years have provided little margin for development financing after covering rising debt service requirements (which have exceeded 20 per cent of exports recently) and consumer imports. Sudan has very small foreign exchange reserves of its own to finance imports. Therefore, the road to development is to be based on unprecedented levels of commitment of external financial support from the Arab community, international development banks and commercial lenders. These sources of financial support have become increasingly aware of the Sudan's enormous development potential and the efforts being made by government to prepare viable development projects.

It is within the Agricultural sector, and in the further industrial processing of agricultural products, that economic development is centred. With large quantities of fertile land, abundant water, an excellent growing climate and a larger rural population, Sudan is capable of becoming a principal supplier of food for the countries in the Middle East. In this respect, the Sudan's important future role and the country's suitability for fulfilling it, were underlined by the general agreement reached at the conference held by the Industrial Development Centre for Arab States (I.D.C.A.S.), jointly with UNIDO, in the Sudan in 1972. The potential for food grain and oil seed development, for sugar, cotton textiles and the processing of other primary outputs, may well be characterized as unique.

8.2.2 Sugar Production in the Sudan:

Sugar cane has been grown for chewing purposes in the Sudan for centuries and a small scheme was established many years ago in the South West for jaggery production. An area of 100 feddans was also grown in Khartoum for a syrup project. Sugar cane trials have been carried out in the North, in the Gezira and at Melut and Mongalla in the South, and have shown that sugar cane can be successfully grown in most parts of the Sudan.

The present sugar industry in the Sudan dates from the establishment of the Mill at Guneid in 1962; a second factory came into production at Kasham el Girba in 1966.

(a) Guneid Factory:-

Guneid is on the east bank of the Blue Nile, some 120 km south east of Khartoum. The soils are typical Gezira clays and the mean annual rainfall is 250mm, falling mainly in July-August.

The sugar project at Guneid consists in total of 44,500 feddans of which 19,500 are under cane. It is a tenant farming scheme, each tenant holding 15 feddans planted on a six-course rotation. Each year the tenant plants two and a half feddans of cane and maintains five feddans as first and second ratoon cane.

It is not primarily a sugar scheme but an adaptation to cane of a cotton irrigation layout, the same that has been used for years on the famous adjoining Gezira scheme, with the exception that Guneid's water is pumped direct from the Blue Nile.

The canal and pump capacities can only provide enough water to each tenant for his crops provided the system of rotation mentioned above is strictly adhered to and that irrigation is practiced on a 24-hour basis. The capacity of the system only permits irrigation intervals of 14 days. This is found to be too long in the hot months and seven day intervals have given better yields. Water distribution is far from satisfactory due mainly to inadequate levelling of the land and management problems with the tenants. Infection of the cane by smut disease has reached a serious degree, and indeed, control is

frequently unsatisfactory.

The factory can accept 4,000 tons of cane per day and is designed for an annual production of 60,000 tons of sugar. The performance figures for the period 1962/63 to 1971/72 are given in table 8-4. It shows that yields have been extremely low and considerable improvements were necessary before economic production of sugar was achieved.

(b) Khashm el Girba Factory

The second factory which came into production in 1966 is located at Khashm el Girba, some 350 km east of Khartoum. This scheme is part of a one million feddan irrigation scheme in which the water is fed through canals from the Khashm el Girba Dam on the Atbra River. The layout is basically the same as for Guneid with the exception that the plantation is run on a State basis (ie, direct labour employment), and that the sugar cane crop is grown on a four-crop rotation of plants. The factory is similar to that at Guneid, both having been supplied by the same consortium of German firms.

The cane is grown on an estate basis and the yields are far superior to those obtained at Guneid because of better irrigation supplies and as a result of superior estate management in place of small-holder management. Table 8-4 gives details of performance at Khashm el Girba between 1965/66 and 1971/72. Production in 1970/71 dropped drastically due to severe water shortage, but all in all, production was far better than that of the first factory.

Table 8-3

PERFORMANCE OF GUNEID SUGAR FACTORY

	Duration of Season (Days)	Average Rate of Crushing (Tons/Day)	Total Area under Cane (Feddans)	Area Harvested (Feddans)	Total cane crushed (Tons)	Average yield (Tons/ Feddan)	Recoverable Sugar % Cane	Sugar Produced (Tons)
1962/63	136	1,035	14,735	8.459	143,350	16.67	8.97	13,263
1963/64	199	1,190	17,750	17,000	238.000	14.00	8.21	19,590
1964/65	172	1,131	19,425	15,029	194,561	12.90	8.54	16,591
1965/66	126	1,347	16,425	14,513	169,755	10.17	8.45	16,028
1966/67	126	1,845	18,195	17,090	232,560	14.57	9.82	22,856
1967/68	134	2,624	20,324	19,215	351,309	18.28	9.47	33,183
1968/69	151	2,235	19,348	18,263	357,559	18.49	8.63	29,149
1969/70	93	2,176	11,998	10,652	202,376	20.20	9.12	18,461
1970/71	136	2,481	13,005	13,005	337,513	25.96	10.99	37,080

Date supplied by courtesy of Guneid Sugar Factory

8.2.3 Government's Policy in the 1970's

Though the two factories did not suffice the increasing local requirements, expansion in sugar production was witheld primarily because of the low world sugar prices and the high cost of production at home. Moreover, the deterioration of foreign exchange reserves which started in the early 1960's continued thereafter. During 1966-70 this deterioration was aggravated in view of the overstretched public expenditure, the inadequacy of available internal sources to finance such expenditure, and the persistence of the trade deficit. With food imports accounting for about one-fifth of the import bill it is quite evident that one of the major demands on agriculture has not been met.

In 1971, the government policy made a new turn as it decided to place a strong emphasis on both import substitution and export expansion activities within the framework of balanced regional development. The regional imbalance was reflected in the reliance of the economy on a very limited number of export crops produced in a spatially concentrated and relatively well developed area while subsistence agriculture retains its hold in the rest of the country. Therefore, the drive towards more balanced regional development was viewed in the context of the development potentialities of the long neglected regions by encouraging the production of a number of products. Indeed, sugar cane was one. To meet the increased domestic demand and to achieve a surplus position whereby Sudan could possibly compete in exports, additional milling capacity would be required. To attain that the government in the early 1970's surveyed thoroughly the local and potential export markets.

TABLE 8-4

PERFORMANCE OF KHASHM EL GIRBA SUGAR FACTORY

Year	Duration of season (Days)	Average Rate of Crushing (Tons/Day)	Total cane crushed (Tons)	Sugar produced (Tons)
1965/66	98	-	105,900	9,640
1966/67	182	2,540	462,200	48,048
1967/68	205	3,018	618,604	60,101
1968/69	203	2,961	601,167	52,961
1969/70	200	3,117	623,354	56,857
1970/71*	130	2,869	372,921	35,543
1971/72	185	3,493	646,270	62,913

*Severe water shortage

Date supplied by courtesy of Khashm El Girba Sugar Factory

(a) Local Market 1966-72

Statistics of local consumption between 1966 and 1972, as provided by the Department of Customs were as follows:

000 TONS

1966	1967	1968	1969	1970	1971	1972
161	171	186	203	217	238	254

This indicated an average annual increase of eight per cent. The per capita consumption in the Sudan in 1972 was 15.8 kg which was lower than most Arab countries, less than neighbouring Somalia and slightly more than Kenya. There was therefore, no reason to expect that the annual consumption was likely to fall off. Thus it was not unreasonable and probably conservative to project forward this past rate of increase and if this was extrapolated to 1982, local consumption was estimated to reach 549 thousand tons.

It became clear that at the present rate of production, the two existing factories would fail to meet demand, as the projected figure for the production of Guneid and Khashm el Girba in 1982 would not exceed, at best 160 thousand tons.

The Sudan relied on the USSR and Poland to supply the difference between local production and consumption. In 1972 however, there was a severe shortage of sugar in the Communist world, and that was immediately reflected on the local Sudanese markets. Riots against the government for failing to provide

an important commodity were everywhere. As a result, the government had to arrange imports from other sources - notably from Taiwan, Thailand, Mauritius, Brazil, China and the UK. This incident increased the government determination to expand local production of sugar, otherwise it would risk losing its support and credibility.

(b) Potential Export Markets

Owing to the political turbulence in the Middle East, the government in 1972 thought that the Mediterranean countries would be less attractive markets. Being much closer to Europe, sugar from PortSudan would be at a freight disadvantage. Of the neighbouring African countries, Ethiopia and Somalia were more or less self-supporting and might be assumed to continue to be so. With plans for expansion in Kenya, they were also unlikely to be importers of sugar for much longer. The most probable markets for Sudan's sugar exports would be those countries in the Middle East which Sudan could supply from PortSudan at a freight advantage over any competitive source of supply.

Countries that were considered therefore to be the most promising markets with their estimates requirements in 1980 were as follows:

Country	Tons
Bahrein, Oman) Dubai, Qatar)	65,000
Kuwait	39,000

Country	Tons
Saudi Arabia	107,000
Iraq	400,000
Jordan	118,000
South Yemen	53,000
Yemen	77,000
TOTAL	859,000

To this list one could well add Egypt. Although at 1972 production matched consumption, it was quite likely that, with a population over 34 million people, their sugar production will not keep pace with the expansion of consumption and by 1980 they could well become a regular customer for Sudan exports. As can be seen, the net import requirements in 1980 of these countries, including, say 50,000 tons to Egypt, might well amount to some 900,000 tons.

It is possible that some of these countries, for example, Saudi Arabia and countries in the Arabian Gulf, might prefer to establish refineries of their own which would buy raw sugar from the Sudan on long term contracts and this is an alternative that should be considered.

With the opening of the Suez Canal, the probable export markets increased to contain Libya, Algeria, Morocco, Syria, Jordan and Lebanon. The probability of these countries being partially supplied from the Sudan was underlined by the agreement of participants at the I.D.C.A.S./U.N.I.D.O.

Conference in 1973 (see figure 8-3).

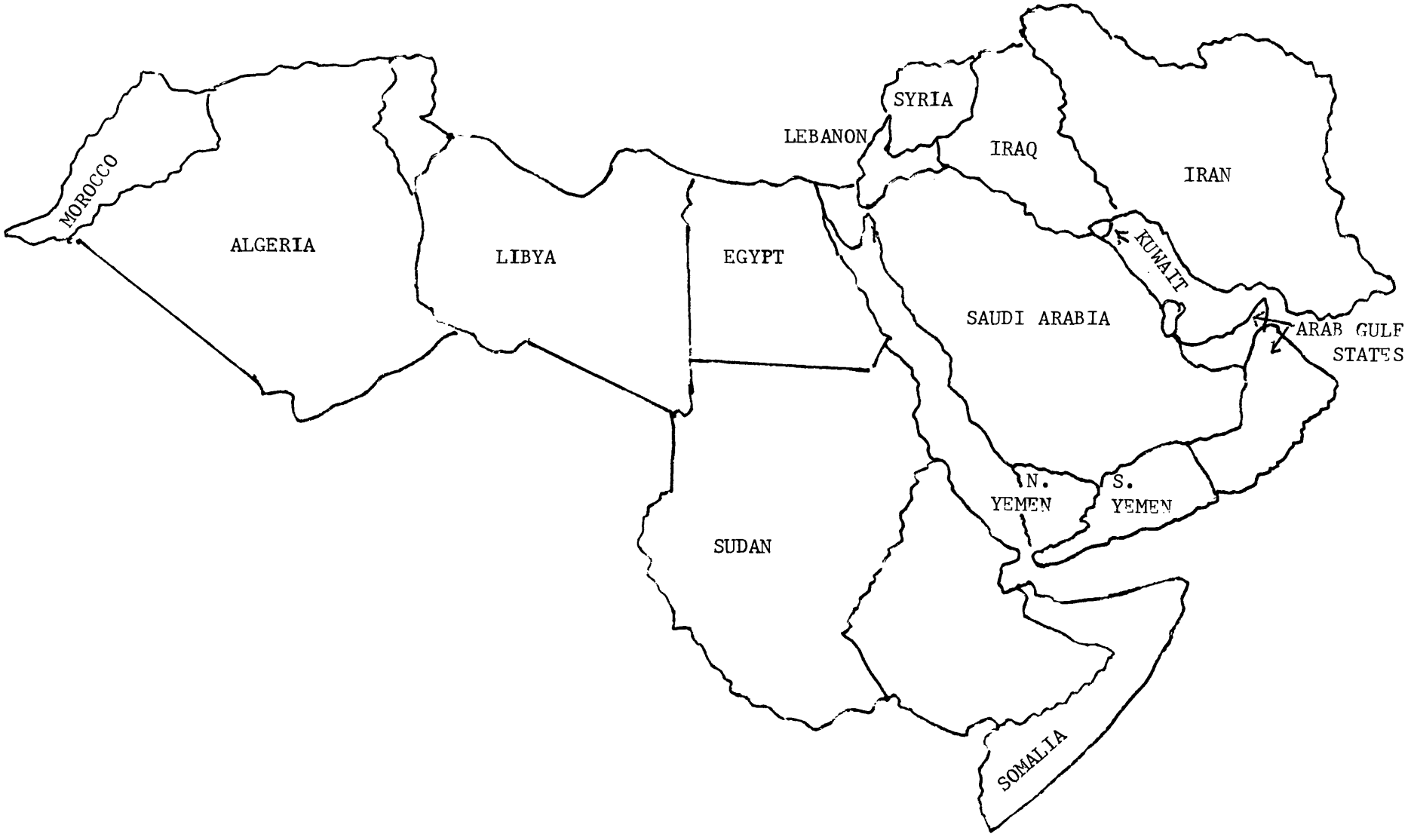
Demand for sugar in this market has been satisfied by a variety of producing countries. Among the countries identified as suppliers during the past two years however, Brazil, India, Cuba and the European Economic Community emerge as the most important suppliers, accounting for two-thirds of the sugar supplied. Of these, only India will have a freight advantage comparable with that of the Sudan in relation to Middle Eastern markets. It goes without saying that due to Sudan's freight advantage, particularly over Brazil and Cuba, in terms of distance from the markets, and due to its ability to move less than full cargo shipments to proximate countries, the country will have a distinct price advantage.

(c) The Response

As a result of the careful analysis of the above and following the 1974 sugar crisis, the government policy was directed towards a much more ambitious plan to compete with vigour in satisfying the sugar needs of the domest market as well as exporting to the probable potential markets. To attain this, six sugar schemes were planned, at Sennar, Asalaya, Melut, Mongalla, Setit, and the sixth factory is the concern of this chapter. Sugar production of all the schemes is envisaged to be 1.1 million by the end of 1985/86. The sixth project is expected to produce about 30 per cent of the total production of sugar in the Sudan, and will therefore play in important role in Sudan's sugar industry.

Figure 8-3

Probable Export Markets



8.2.4 Information Regarding the Site

We have already shown that the government decided to undertake a new sugar project to produce about 30 per cent of its 1.1 million tons planned production. In selecting the most suitable site for this project, the following aspects were taken into consideration:

(a) Climate - Whereas sugar industries have traditionally been located generally in high rainfall areas, experience has shown that a semi-arid climate with irrigation has a number of advantages. There is a much smaller annual fluctuation in sugar production where irrigation is provided, due to the elimination of the major natural variable rainfall. In addition, a longer milling season is possible in a semi-arid climate, and cane yields are usually higher, due to a greater number of hours sunshine, and better maturity is assured by the control of drying off before harvest. In field problems with cane transport under wet conditions are minimised.

(b) Water - A reliable and sufficient supply of good quality water must be available.

(c) Soils - should have no major restriction such as inadequate depth.

(d) Transport - Economic, adequate and prompt transport of sugar is required from the factory to internal consumers and to the coast for export.

(e) Power - Adequate power supply is required for initial development.

(f) Sufficient land must be readily available and have a good topography for surface irrigation with adequate regional drainage.

Other details have to be taken into account, but the above are the most important considerations.

8.2.5 Search for Alternative Sites

A major problem in Sudan relates to the wide disparities in regional development. The inter-regional inequalities and imbalances are manifested in the distribution of per capita income in the least developed regions, which is of the order of one-third of its level in the developed areas. The problem of wide disparity in regional development and income distribution is further augmented when viewed in terms of the relationship between agricultural and non-agricultural per capita incomes. In 1970 the former amounted to only one-sixth of the latter.

It is therefore essential such a major scheme, and other development projects, be geared to solving the problems of regional imbalances. With this in mind, three alternative areas were allocated for consideration:

(a) West Bank of the Blue Nile from El Roseires to Singa;

(b) East Bank of the White Nile from Malakal to Mongalla;

(c) East Bank of the White Nile from Malakal to Kosti.

Preliminary investigation of these areas revealed the following: The first alternative area was rejected due to lack of reliable water supply. There is insufficient water available in the Blue Nile for a major sugar scheme until the raising of the Roseires Dam has been completed. The second area was also rejected on account of difficulties of communication, being nearly 1,000 km from any railhead. The third area (Malakal, Kosti) was found to be the most favourable location. However, the area between Malakal and Renk also suffers from difficulties in communication, being some 400 km from railhead and power.

The area between Renk and Rabak was therefore investigated, and it was found that the section between El Jebelein and Rabak was more suitable than that between El Jebelein and Renk on account of both communications and soil.

8.2. Locational Factors

To reduce the uncertainty involved in defining the project site the following locational factors were analysed with respect to the Rabak area:

(a) Climate

The climate is very hot for the greater part of the year with summer rainfall occurring for about three months. The mean annual rainfall is approximately 400mm at Kosti. About 90 per cent of the total annual rainfall occurs during the June- September period. There are about three to four occasions when rain exceeds 25 mm. As the rainfall is low, there will be need for considerable quantities of

irrigation water throughout most of the year.

Sunshine hours are high with an average of 9.4 hours/day or 77 per cent of possible hours. The level of solar radiation is also high throughout the year, which should be favourable for a high rate of crop yields. Humidity is very low except during the rainy months. The average wind speed does not appear to vary much during the year, but its direction changes from northerly during the dry season to south south west during the rainy months, June to September. Approximately 10 to 15 violent dust-storms occur each summer, mainly in June.

All in all, the semi-arid climate of this area is suitable for the growing of sugar cane under irrigation.

(b) Water

The White Nile which runs from Malakal to Khartoum will be the source of water. Its water is entirely suitable for irrigation; it is in general similar to Blue Nile water which has been used for 50 years in the Gezira. The water will be lifted 40 meters by pumping, and will be distributed across the estate by countour canals, and from there by gravity to the cane fields. The quantity of suspended solids varies during the year, but does not constitute a hazard to pumping.

(c) Soil Survey

The soil of Rabak area comprises brown clays, which are

derived from basic rocks in the Ethiopian highlands, and have been deposited by the Blue Nile and form part of a very extensive clay plain of the Central Sudan which includes the Gezira region. This is in contrast to the relatively less extensive area of dark grey clay soils occurring west of Rabak, which are derived from alluvial deposits of the White Nile, these latter soils being characteristically saline and sodic. The area selected must be as close as possible to the White Nile to minimise pumping costs, but must also be entirely on brown clay soils.

The soils of Rabak area, in conformity with the Gezira clay elsewhere, are in general, very fertile, and are highly suitable for sugar cane production.

The results of the soils exploration and testing programme have been used in engineering analysis to establish criteria for the design of major pumping features. These include canal and control structures, pumping plants, factory foundations and roads.

(e) Existing Infrastructure

(1) Roads: The only paved all-weather roads up to 1973 were those from Khartoum to WadMedani on the Blue Nile and from Khartoum to Jebel Awlia on the White Nile. All other roads were generally rough and unpaved. Roads on the Blue Nile clay areas, which covers most of the land between the rivers, became extremely muddy in the rainy

season, and are virtually impassable. These roads become heavily rutted and present a poor driving surface in the dry season. While the soils on the White Nile are more granular, they contain sufficient clay as to be virtually impassable in the rainy season. While the dirt roads can be used by cross-country vehicles in the rainy season, such travel is slow, costly and inadequate for major movements of materials or produce.

(2) Port, Rail and River Services: We have already shown in Chapter Five that the arterial bulk transport system of the Sudan is based upon PortSudan served by 5,400 km of 3'6" guage railway and about 2,000 km of navigable waterways on the Nile. This network which is shown in figure (4-5) permits access to all the more densely populated and economically important regions of the country.

The Port's effectiveness is limited by the inadequacy of rail services to and from the hinterland which gives rise to heavy delays to imports and which is reported to be a major obstacle limiting development of Sudan's export potential. The government plans to establish a second port at New Suakin about 45 km to the south, linked by rail to the existing rail system.

The dominating features of the Sudan Railways are

that they operate under difficult desert conditions and that they have virtually a monopoly in the handling of long distance bulk traffice, except where alternative river routes are available. The railway road bed is built on the native soils and is raised very little above the natural ground surface. During the relatively short season of rainfall, flash flooding, unpredictable in location and incidence, breaches the formation and interrupts or delays services; July and August are the vulnerable months with occasional interruptions in April, May and September. In most years there has been at least one interruption of six to eight days' duration.

In the early 70's, efforts have been initiated by the government to improve railway performance and special importance is being attached to increasing the availability of main line diesel electric locomotives through a priority programme of major overhaul and correlated purchasing of spares.

In 1973 import traffic largely exceeded export traffic. The imports included over 100,000 tons of sugar a year. Import substitution by local production of sugar would substantially reduce the import traffic load, particularly on the busiest section between PortSudan and Khartoum. The eventual development of an export surplus of Sudanese sugar would improve the

import and export balance of tonnage still further and contribute materially towards more economical traffic conditions for railways. However, at the early stages of the project it was expected that there would be an added traffic load in the import direction from PortSudan to Rabak consisting of the project's requirements of machinery, stores, fuel, oil, petroleum products, etc.

Regarding river transport, the White Nile is an important traffic artery between Khartoum and Juba carrying over 150,000 passengers a year and nearly 100,000 tons of freight, of which the latter is almost entirely in the southerly direction. There is also the reach of 290 km between railhead at Karema and Dongola, which transports nearly 100,000 passengers a year and about 40,000 tons of freight.

The sections of navigable waterway of special interest to Rabak area are those between Rabak and Khartoum and Rabak and Juba. At the present time, the river service between Khartoum and Kosti (near Rabak) operates only during the rainy season when roads are impassable. Hitherto the operations of the River Service have been in deficit but the management has said that, provided it can have at least two years' prior warning of traffic and a firm assurance that the traffic would be in operation, it could obtain and introduce into service additional tugs and barges

to carry sugar and any other suitable traffic for the project at rates substantially lower than the corresponding railway rate.

Bearing in mind the serious problems of the railways, river transport was expected to play a vital role in the distribution of sugar. There was also the point that development of the river route between Khartoum and Rabak/Kosti as a deliberate and desirable policy decision by the government would rationalize the use of transport resources in the country's interest.

(3) Telecommunications: Manually operated telephone exchanges are located at Kosti and Rabak, both of which are within the telecommunication system of the country. Communication between Rabak and Khartoum is satisfactory.

(4) Electricity: Electrical power is transmitted to the Rabak-Kosti area by a 100 km long, 110 KV line from the sub-station at Sennar. This system is part of the Blue Nile grid which is served by both thermal and hydroelectric generating units. In 1973, the line serving the Rabak-Kosti area had a capacity of 20 MVA, but only 15 MVA could be made available at Rabak by the Central Electricity and Water Corporation. The early development plans of the project envisaged an increase of 1.0 MVA in 1974 and another 1.5 MVA in

1976, which would be met by the C.E.W.A.

(e) Labour Availability

We argued before that the population of the Sudan has been increasing at the rate of 2.8 per cent per annum. Only 17 per cent of the population live in towns and the rural population of 12.2 million is spread over 2.5 million square kilometres.

The last house survey was conducted in 1967 but, because of hostilities, the Southern region could not be included. From the 1967 survey it was possible to determine the economically active population and the number of persons employed for wages. We have shown these statistics in Chapter Four.

The approximate number of employees for the proposed sugar estate is in the region of 20,000 to 25,000 of whom about 11,000 will be temporary workers engaged in cane cutting between November and May, while the remainder will be in permanent employment. It was concluded from the general employment situation in the Sudan that there should be no difficulty in obtaining sufficient permanent and semi-permanent labour for the scheme.

There is a long history of employment of casual workers in the Sudan, primarily for cotton picking in the Gezira scheme. The Gezira Board, with the help of the Labour

Department, assists the tenant with the recruiting of labour from outside the Gezira area. The total number of pickers employed is in the region of 500,000 of whom 77,000 are recruited on behalf of the tenant by the Gezira Board. There is strong evidence that the present seasonal workers are anxious to find employment for as long a period as possible, and regard the four months cotton picking work too short for their wage earning aspirations.

In provinces of Kordofan and Darfour, the harvesting of the crop is completed by mid-November at the latest, following which the farmers set out to look for work; they are being forced to wait until mid-January for cotton picking to commence. They expect to return to their farms to prepare for the rains which commence in July. This fits in very well with the sugar can harvest period from November to May.

Regular employment is in demand, and will continue to remain so. Farmers would prefer to work for regular wages than continue with their subsistence farming. It is considered that the longer period of employment offered by the sugar estate will be more attractive to most workers, except for the very skilled cotton pickers.

Due to its geographical situation, Rabak area will have no difficulty in attracting workers from the Western and Southern Sudan. It goes without saying that there

should be no problem in finding sufficient workers from the Southern region due to the very severe underemployment problem in that area. A further source of labour is from the migrant population who travel from Nigeria and Chad across the Sudan on pilgrimage to Mecca, as illustrated previously in Chapter Four.

With sugar estates having been operating in the Sudan over the past decade a considerable amount of local expertise has been built up and there is a basic nucleus of trained personnel at the existing estates, so that given the co-operation of the Sugar and Beverages Corporation, good facilities exist for pre-training selected individuals within the Sudan for most of the skills required for the efficient functioning of a sugar estate.

(f) Availability of Construction Materials

For earth fill, material from the required cut excavations might be used. Brown and grey clays, gravels, highly weathered rock and flood plain silts are all available in Rabak area. With compaction control, brown and grey are suitable as construction materials for fills under about seven meters high; the gravels will form a suitable road construction material; the weathered rock will also be adequate for roads, and the silts of the White Nile flood plain are expected to form satisfactory canal fill material when recompacted.

Gravels from Qoz Girgaf may be used as coarse aggregates for concrete, and out crop in more than adequate quantities. The excess capacity of Rabak Cement Factory would be available for use on the sugar project and the amount available exceeded the requirements of the project.

Hardwood is available in the Sudan from the forests, Department Stores in Khartoum, or from various stations, for example, Juba and Wan in the south. The size of hard timber produced is suitable for constructional requirements. The only problem remained with the availability of red bricks. The nearest source is at Sennar which is approximately 100 km distant. Transportation to Rabak could pose problems due to shortage of railwagons and the state of the road. Due to the ready availability of cement from the Rabak cement plant, it was found more economical to use concrete blocks for construction rather than red bricks.

8.3 Stage Three

This stage involves defining the area and factory site. It also comprises the process of establishing the organizational and operational requirements of the project, (project infrastructure, manpower training, irrigation system and agricultural development).

8.3.1 Definition of Project Site and Factory Location

On the basis of the collection and sifting process of information carried out in the previous stage, Rabak area was chosen on six counts: Firstly, the semi-arid climate and irrigation potential should permit reliable production of sugar. With a rainy season averaging three months, a high number of sunshine hours and a high solar radiation, and with three months of low temperatures at night during the harvesting season, high crop yields, and excellent juice quality were expected. Secondly, good quality of water is abundantly available throughout from the White Nile. Thirdly, sufficient land is available for the sugar estate, well drained, non-saline, and relatively easy to prepare. Fourthly, the Sennar-Kosti power line would provide adequate power for the development stage, and it will also provide an auxiliary source of power thereafter. Fifthly, the estate is close to Rabak with the railhead 30 km from the proposed site of the factory. This connects both to Khartoum and through Kassala to PortSudan. In addition the rail bridge across the White Nile at Rabak provides rail and road access to the west. Finally, construction materials are available locally.

The major factors influencing the decision on the location of the factory were (a) cost of cane transport to alternative sites and (b) differences in construction costs. Two points were considered. The first was located in the centre of estate and thought to minimize transport costs within the estate. This point was on the clay soils which cover the major part of the estate. It has been estimated that the additional foundation costs on clay soils would be of the order of £2.0 million. The other alternative site was

on a gravel outcrop of the western edge of the estate at Qoz Girghaf. Construction at this point would not require the £2.0 million to overcome soil movements. However, this would mean an approximate increase of 20 per cent annually in the cost of transporting sugar cane to the factory and an additional 20 per cent in transport equipment expenditure to cover the increased movement.

After calculating the initial net capital saving and finding the present value of the annual additional cost for 20 years, it has been decided to locate the factory on the gravel site rather than the central point - on the clay soils.

8.3.2 Structure of the Company

Between April 1973 and February 1975, the project was discussed with various departments of the government of Sudan and potential private investors. On 11 March 1975 Kenana Sugar Company Limited was incorporated with the purpose of developing and operating an integrated cane estate and sugar refinery within the area chosen previously.

Shortly thereafter, the following agreements were signed:

(1) The lease under which the Company leases from the government approximately 150,000 feddans, at an annual rent of 10 piastres per feddan, with an option for an additional 150,000 feddans for future expansions.

(2) The Sugar Sales Agreement under which the Company agreed with the government the division of sales

of sugar between the internal and export markets, and the formula for calculating the price at which sugar would be bought by the government for domestic consumption. This Agreement also covers the government's major concession in allowing the Company to establish an overseas account for holding the proceeds of the sale of exported products, and from which the Company's foreign currency commitments will be met, particularly in the servicing and repayment of external loans.

In early 1976, the founding shareholders of the Company invited the government of Kuwait to participate as a shareholder in the Company's equity capital. Now holdings are as follows:

Holders	Percentage of Total
Sudan Government	40.00
Kuwait Government	23.00
The Arab Investment Company (Ruyadh)	17.00
Sudan Development Corporation	10.00
Lonrho Limited (UK)	3.43
Nissho-Iwai Limited (Japan)	1.41
Gulf Fisheries Company (Kuwait)	1.41
Unsubscribed	3.75
TOTAL	100.00

The company operates through (1) The Board of Directors on which all shareholders are represented. The Chairman of the Board is appointed by the government of the Sudan.

The Board appoints the Managing Director. (2) The Executive Committee of the Board which is empowered to reach decisions on a variety of matters. This committee is composed of two representatives of the government of Sudan, and one representative of each of the Arab Investment Company, Sudan Development Corporation, and the Government of Kuwait. (3) The Finance Committee which advises the Board on financial matters, (4) Consultants, auditors and legal advisers have been engaged by the Company.

8.3.3 Operational Requirements

(a) Project Infrastructure

(i) Railway: The sugar estate will be connected to the Sudan railway system by means of a railway line running from Rabak to the sugar factory. The line will be operated as a private siding from Rabak and will lead to the sugar factory, with a branch going to the river berth and customs stores three km south of Rabak. By following the higher ground it will be on the most suitable soils and will not interfere with any existing agricultural schemes. By following the alignment of the main access road and transmission lines to the factory, maintenance and supervision will be facilitated and the crossing of the main irrigation canal will be at a pump station and will not require any major bridging. The estated cost to the project of the construction of the rail spur is £146,000. The track materials will remain the property of the Sudan Railways and will be hired by the project at

a rate of about £12,000 payable annually.

(ii) Roads: The clay soils on which roads must be built are subject to rapid deterioration when wetted during the rainy season. Traffic during that period will cause heavy rutting of clay surfaces and ponding of water in the ruts will cause further softening and deterioration. Three types of roads will be built:- (1) a 30 km long main access road from Rabak to the factory, administration complex and main residential area. This will be an essential link not only during the operation of the estate, but also during construction. (2) Estate roads will be used for access to irrigated areas, farm villages, and also for lane traffic. Surfacing of estate roads will be limited to those which are in substantial use in the rainy season and which are most heavily used in the harvesting season. (3) Farm roads will be built adjacent to canals within the thousand feddan units from soils excavated from farm drains.

(iii) Power: Initially, electricity for the pumps will be taken from the National Grid; later bagasse waste from the factory operation will become the main source of fuel for generating power. The Public Electricity and Water Corporation (of Sudan) will provide the necessary lines. The power line that will connect the Rabak substation to the estate will only be in continuous use until the start up of the factory in 1980. It will, however, provide access to a useful source of standby power in future years.

(iv) Communications: The project will utilise a PABX telephone system, with provision for 10 trunk lines into the public telephone system and 100 extension lines. A UHF single sideband transceiver with simplex operation will be used for the two-way radio link between the factory, Khartoum, PortSudan and Atbara. An airstrip has been provisionally located some 2½ km south of the factory. It will be a one kilometer long, raised, all-weather gravel surfaced runway for light aircraft.

(v) Administrative Complex: The administrative complex will be situated adjacent to the factory complex and will contain office accommodation for administration, factory, agriculture and transport personnel. It will be the centre of all communications systems throughout the estate. Offices connected with the administration, operation and maintenance of the factory will be located within the factory.

(vi) Main residential centre: The main residential area will accommodate those personnel who are employed in the management, administration, operation and maintenance of the estate, factory and harvesting equipment. It will be situated to the west of the sugar factory in order to avoid any odours and soot carried by the prevailing north to south winds.

Three villages will make up the main residential centre;

namely the senior village - 80 houses are planned to be built for the senior staff; the intermediate staff village - 210 houses, and the junior village which will cover 200 feddans of land and will be situated to the north west of the factory. The village will house 1400 artisans and labourers, excluding the plantation labourers who will be housed in farm villages.

(b) Manpower, Education and Training

By the time production gets into full swing the company will need a staff of almost 2,293 and will be employing in the order of 16,800 workers. To be more specific, staff employed at full production will be as follows:

Category	Number	
Managerial Staff	206	
Employees	2087	
Subtotal		2293
Agricultural Labour	7800	
Harvesting Labour (seasonal)	9000	
Total Labour Required		16800
TOTAL NUMBER EMPLOYED		19093

These numbers have to be built up over a period of two years and a recruiting programme of this magnitude, coupled with the limited time available for training, will mean that considerable reliance must be placed on employing as many experienced men as are available without unduly depleting

the staff of the existing estates.

The success of the project will depend on the general level of education of the candidates available; the success in selection of the employees; and the effectiveness of the training programme.

The Sudan is relatively well endowed with educated men in comparison to other developing countries. The present education system provides a 12-year education programme based on two periods of six years. Higher education extends to University level. It is important that management and key technicians and artisans have practical experience as well as institutional training of the educational establishments in the Sudan which cover most aspects of education. A major weakness is that there are insufficient skilled artisans in the Sudan and the current training institutions are finding it difficult to keep up with the demand. As specific trade training will have to be undertaken to meet the needs of the new sugar project, a training school will be established at Kenana and advantage will be taken of those schools already established in the sugar industry, or run centrally under the government's existing and expanding education and training policies.

It is the policy of the Company that as many management and technical positions as possible will be made available to local Sudanese people and that the Company's management and operations must be carried out by the most able people in order that they may be successful. It is for this reason

that management and executive development, and training at all levels of the Company will be undertaken as a matter of high priority.

(c) The Irrigation Unit

The main canal system - 29 kilometers long - will transport the water to the fields through an irrigation network comprising:-

(1) Primary canals, following the contours of the land.

(2) Field channels.

(3) Long line furrows, which form the actual field irrigation system.

The whole system will be controlled by structures, regulators, gates and distributors of a type to ensure distribution of the right amount of water under the required head.

(d) Agricultural Development

The land to be prepared for planting is largely free from trees and bushes, so that clearing costs should be minimal. Moreover, its uniform topography ensures that little levelling will be required and land preparation will mainly consist of ploughing, harrowing and furrowing to obtain tilth for planting.

The equipment to be used throughout the agricultural operations will be modern and specialized. The main repair facility will be established centrally, and preventative maintenance, spares stores and refuelling facilities will be provided in each agricultural area.

Cane has been grown at the project site since 1973 and the nursery at Hillat Abbas still exists for experimental purposes. The first cane grown for ultimate estate use was planted on the 2,000 feddan Pilot Project Extension in early 1975, following completion of the nine km pilot channel.

Advantage has been taken of the close co-operation with the existing sugar estates in the Sudan in the Company's early experiments to determine those cane varieties best suited for planting. At the same time, the Company is increasing its research into many aspects which ensure healthy cane growth, including fertilizer control, weed control, differing irrigation frequencies and control against insects, pests and disease.

8.4 Stage Four - Implementation and Evaluation of the Project

In the previous sections we have argued that a decision on the appropriate location was made and the parameters were fixed. Rabak area was chosen as a site after the process of gathering and sifting of information revealed that the fertile alluvial soils of the Blue Nile flood plain approached close to the course of the White Nile from which the water for irrigation would be taken. Other factors were proximity to the main line railway, electrical and cement supplies at the local town of Rabak, and the extensive gravel ridge on the southern side of the estate which formed an ideal site for the factory and township complex.

What remains is: (a) implementation of the project, which will come to a conclusion by starting up production on site. This

process involves decision makers in another, and very important requirement, that of following up the progress of the project and solving the major problems expected to crop up during this process. In fact, one of the major problems the project faced was the difficulty of transporting so much equipment, plant and materials to the site in such a short space of time. (b) Evaluating the impact of the project within the Sudanese economy. This is important as it involves the decision makers in assessing the economic and social benefits of Kenana project in a changing economic and political environment which over recent years has increasingly encouraged agro-industrial developments.

8.4.1 Implementation of the Project

Actual construction of the factory was started in January 1976 when the first of three convoys of heavy earthmoving plant arrived. The design and construction of the factory is an international venture, with a US based company responsible for the basic design, whilst a French company is carrying out the detailed engineering, equipment supply and on-site supervision. Most of the equipment used was imported from France and Japan, financed by export credits which have been negotiated with the French and Japanese authorities. The factory will be equipped with the most modern type of machinery. It will have a crushing capacity of 17,000 tons of cane delivered to two milling tandems during every 24-hour period of the grinding season.

The refinery, built as an integral part of the factory, will produce approximately 330,000 tons of refined white sugar per year at full production.

Some 2,000 feddans of seed cane had been planted by the end of 1976 - sufficient for planting approximately 10,000 feddans on the estate. The extremely rapid and healthy growth of the seed cane justified the care and foresight taken in selecting the site for Kenana. The civil works will allow irrigation water to be made available to 81,000 feddans by December 1979. The sugar estate itself will be divided into five separate areas of approximately 16,000 feddans each for which an area manager will be responsible. These five areas will in turn be composed of four farms, and each farm will in turn be subdivided into roughly four sections of about 1,000 feddans each. In this way, individuals working at every level will be able to relate to and identify with their own group and have a closer relationship to the land on which they are working.

Housing for employees will be provided in separate farm villages, each with its own amenities such as schools, mosque, market and clinic. The planners' logic by spreading settlement throughout the estate and breaking up the agricultural operation into smaller units is to foster community consciousness and all the benefits that arise out of it without losing the economies of scale inherent in providing cane for what will be one of the largest sugar factories in the world.

Since its inception, the project faced two major problems. Firstly, the difficulty of transporting equipment plant and materials to site. Needless to say, access and efficient movement is vital to manufacturing activity. The planners were aware of the obvious limitations

of the transportation sector in the Sudan. However, to solve this particular problem, the following decisions were taken:-

(a) To establish an extremely efficient clearing and handling operation at PortSudan. Operating from the South Quays, the Company's fleet of five mobile cranes ranging from seven to 100 tons capacity and eight forklift trucks, have enabled direct delivery from most ships so that the congested North Quays have been largely by-passed.

(b) To continuously co-ordinate with Sudan Railways and hire from them 50 flat wagons which are managing an average of two round trips per month.

(c) Arranging a contract with a foreign transport contractor to handle the overland haulage of the 3,000 tons of 'out of gauge' equipment too bulky for Sudan Railways to handle.

(d) Leasing since May 1976 of DC-3 aircraft to enable daily passenger and freight flights from Khartoum and PortSudan as required.

(e) Introducing new techniques to overcome bottlenecks. For instance, during the fuel crisis in the Sudan at the end of 1976, five 'bladder' tanks, each of 8,000 gallons capacity were purchased which, when loaded into conventional half-covered wagons, supplemented Sudan Railways' overstretched tanker fleet.

The above decisions have ensured that in excess of 6,000 tons of materials and equipment are now arriving on site every month.

The second major problem is that the project has been affected by unprecedented inflation and economic instability in the industrialized countries providing equipment and major contractors. This necessitated a thorough revision of the forecasted total cost of the project, which includes the high expenditure on infrastructure, together with the cost of the complete irrigation supply system. Such basic and enduring investment is more frequently financed by concessionary infrastructure loans than by commercial companies from their own sources. To this end, the government is seeking such loans to finance the different aspects of the project.

8.4.2 Evaluation of the Project

We have mentioned at the beginning of this section that the Kenana Project will continue to benefit from the changed economic and political environment within the Sudan. Specifically, the Development and Encouragement of Industrial Investment Act passed in 1974 has greatly assisted the project in a number of ways. For example, freedom from income and business profit taxes for ten years; freedom from import duties, agreement to lease the land required at the nominal rent of 10 piastres per feddan per year. Further, the Company received priority at PortSudan, priority on the railways, priority for fuel and import concessions. In turn the project is expected to benefit the Sudan and solve part of its problems.

The Sudanese economy has suffered in recent years from a shortage of foreign currency. Sudan's foreign reserves are almost in the red. The project is expected to help in two directions. Firstly, to enable Sudan to save such foreign exchange as would otherwise have been expended on imports of sugar; secondly it will generate foreign exchange for the Sudan on the exports of sugar. In this connection, it must be noted that the Sudan has traditionally derived the bulk of its foreign exchange from the export of cotton. The world prices of sugar and cotton are not related, nor is there reason to believe that the quantities of sugar and cotton produced inside the Sudan would be related. For this reason, it is expected that the development of this scheme would even out the receipts of foreign exchange and make for greater economic stability.

The project is also expected to provide employment for Sudanese labour on a major scale. It is expected that approximately 2,300 persons will be employed in senior and junior staff positions. In addition, a large number of workers will be employed in the fields both on a continual basis and temporarily during the harvesting season. Direct agricultural operations will provide jobs for 7,600 workers and 200 supervisors. These will be employed throughout the year. Harvesting will provide jobs for approximately 9,000 during the harvesting seasons. Other jobs will be provided for drivers, messengers, etc. Thus in broad terms, employment will be provided for 20,000 Sudanese. This is of course only the direct employment which will be created by the project. There will be secondary employment created by both the spending of wages and salaries and the purchase of other goods and services.

It is expected that part of wages and salaries will be spent in the immediate area of the project on goods and services produced locally and elsewhere. However, a significant part of the total wage bill will accrue to the seasonal labour force used for harvesting. Although a part of this will be spent locally, it is expected that some of the benefits will spread through to the less developed regions of the Sudan from which the migratory labour is derived.

The project will also benefit the country by providing training facilities and by increasing the level of skill in terms of technology, agriculture and production for local employees. Allowance has been made for both formal and on-the-job training of Sudanese nationals. This means that the project will not only be drawing on the supply of trained persons, but will also contribute to it.

The broader effects of the project on the economy of the surrounding area must be emphasised. In contrast to many development projects which are based on Khartoum, this project will have a major impact on the growth of a less developed rural community. The regular demand for goods and services emanating from the wages paid to employees will, by itself, provide a basis for sustained economic activity in the surrounding area. This will in turn, result in increased communication between the area and Khartoum, with respect to movements of goods; and reduce the previous pressures of migrants from this region on the capital of the country.

It is also expected that the project will have indirect benefits for the Sudanese sugar industry as a whole. The undertaking of applied research and the injection of expertise from developed countries will influence the technical efficiency of the industry. The benefits accruing to the scheme can be expected to be of value to the industry as a whole, in the same way as the evolution of the project has benefitted from the accummulated knowledge already available in the Sudan.

In addition to the benefits mentioned above, one must also mention the benefit of providing improved local infrastructure, roads and facilities, particularly at Rabak and Kenana. The project has financed a certain amount of infrastructure which would not normally be provided by an industrial or agricultural investment. In particular, housing and social services will be provided for workers. One can safely say that, had this not been paid for by the project, it would have had to be made available from elsewhere in the economy.

Finally, the Sudan will benefit from the project as a confirmation of the country's important position as a most suitable centre for the development of major agricultural schemes. Moreover, the Company has provided the opportunity for Arab governments and investment companies to support the production of a basic food commodity, which may be produced and consumed within the Arab World. This demonstration of Arab economic co-operation within the semi-private sector may serve as an example for future developments.

8.5 Summary

In this chapter we have sought to discuss industrial location decisions from the point of view of promoting industrial development. As the analysis presented depends on the previous chapters, the central theme can be seen as an attempt to pull the threads together in order to demonstrate the place of location decisions within the dynamic process of national planning.

As a corollary to the above, the location decision making is viewed as one facet of a wider strategic investment policy aimed at exploiting the potentialities of the country in the most productive way[8] for two reasons. For one, capital resources in the Sudan are scarce and hence the government should adopt sound investment policies. For another, the government is faced with many critical challenges - problems of poverty, underemployment, balance of payments problems, domestic regional disparities, etc - which if not being tackled wisely, might lead to social and political tension, and eventually stagnation of the whole economy.

The statement made by the normative theorists of location, that decision makers engage in optimizing behaviour or select location alternatives on the basis of ensuring maximum profits, is invalid in the case of Kenana Sugar Complex.[9] This is attributed to the fact that decision makers in the location decision context could not ignore the impact of the interplay of the socio, political and economic factors, variations in information, the conflict of interests, and the inconsistency of the assumptions involved in the normative theories. An alternative context in which the decision

took place is that of bounded rationality put forward by Simon[10] which appears to be a closer depiction of reality for two counts. Firstly, the objectives were clear: expand the production and refining of sugar to meet local demand as well as exporting to Arab countries; and secondly, the constraints were appreciated: lack of information, internal environmental pressures, turbulence of the external political and economic scene, etc. Simon's model proposes that sites will be selected on a satisficing basis, however, on this issue our study calls for modification based on the size of the Kenana Sugar Company; as its ability to sustain and undertake a comprehensive research for locational alternatives was clear.

The sequence involved in the location decision is a part of an on-going strategy rather than an isolated event. This argument is supported by a number of facts. First, the character of the decision which basically leads to the establishment of a new plant is basically non-routine and non-recurring. Second, as the decision is very complex, one cannot resort to a suggested frame of reference or blueprint of requirements and opportunities as suggested by Simon. Third, by splitting the decision process into stages, it will be possible to decide at what stage of the decision making process determinants of locations are considered and assessed.

Consequently, for analytical purposes, we have elected to split the decision process into four stages. Stage One: The threshold of the decision process. The most important aspect of this stage is that the location decision is seen as one aspect of the government strategy towards economic and social development. The

potential for agricultural development is so great, that within this sector, and in the further industrial processing of agricultural products economic development is centred. With large quantities of fertile land, the country is capable of becoming a major supplier of food for the Arab oil producing countries. This being the case, a decision has been taken to expand the production and refining of sugar. It is possible to conclude, therefore, that three forces have jointly triggered the decision, domestic pressures, external opportunities, and external pressures (see figure 8-1).

This was followed by Stage Two which concerned gathering, sifting and evaluating information regarding the requirements of the project. A general survey of the most important aspects was conducted. This covered elements like climate, water, power, transportation and availability of land. The search for the site was undertaken against a background of interregional inequalities and imbalances which were manifested by the distribution of per capita income between the different regions. It was, therefore, essential that such a major scheme be geared towards solving the above problems within the context of the constraints imposed by its physical and technological requirements.

The study pointed out that the actual selection of the site was taken in two steps. First, selection of a region in which the plant would ultimately be located. Consequently Rabak was selected from three alternative areas for six reasons: (a) climatic conditions, (b) availability of water, (c) sufficient land, (d) power, (e) transportation, (f) Kosti bridge offers connection opportunities

with the Western part of the country. Following this initial definition of the region, the second step involved examination of specific sites for the factory. The major factors which influenced the final selection of the site with Rabak region were two-fold: (a) transportation costs of cane, (b) differences in construction costs.

In this juncture, it is interesting to note that the importance of labour stressed by Dunning[11], Cameron and Clark[12], Keeble[13] and Smith[14] was not supported by the above findings. Moreover, the selection of the site within the area is partially a classical example of Weber's argument that transportation cost is the most important determinant. Indeed, it is hard to say Weber was wrong in this particular case.

The final stage concerns the implementation and evaluation of the project. This is important as the problems and pressures faced by decision makers during the process of implementation would be reflected upon. One of the major problems the project faced with the difficulty of transporting equipment and materials to the chosen site.

Apart from this, and other difficulties, the decision makers involves themselves in assessing the economic and social benefits of the chosen response and its subsequent location decision. The study found that the project will have far reaching effects on its immediate area as well as for the nation at large. Regarding the latter, the project will enable the country to save foreign exchange as would otherwise have been expended on imports of sugar;

it will also generate foreign exchange on the exports side. It is also expected to provide employment for Sudanese labour on a major scale. For its immediate surrounding area the project will have a major impact on the development of the rural community. One final significant observation remained to be pointed out. The progress and development of Kenana site in the future is closely bound to progress in administration and managerial practices. Failure to improve them is tantamount to waste of investment capital. Intensive capital investment is an expensive substitute for efficiency. Nevertheless, capital investment and improved efficiency should complement eachother.

CHAPTER NINE

CHAPTER NINE

CONCLUSIONS AND IMPLICATIONS

9.1 The Issues: An Overview of the Major Findings

At the outset of this concluding part, the prime aim of this research has been exploratory, in the interest of understanding the planning of industrial location of the Sudan. Detailed findings are presented in the summaries at the end of the earlier chapters. This chapter provides an overview of the major findings as well as suggestions of the implications that these findings have for the future development of the planning of industrial location in the Sudan. Although the main objectives which guided this study have been largely met, one feels that there are other interesting areas which require further investigation, and to this end, some suggestions for future research are provided.

The major findings of this study may be conveniently discussed in the context of the issues raised, and these are:-

(1) Understanding the existing pattern of industrial location in the Sudan and finding points of similarity and/or departure with different location theories.

(2) Identifying the main determinants that influence locational decisions, particularly to what extent

have these factors tended to bring concentration of industry in Khartoum area rather than the peripheral?

(3) The role of the government in influencing the distribution of economic activities. Central to this, however, the different forms of government intervention will be highlighted.

(4) Identifying the stages of the locational decision for the purpose of showing the place of location decisions within the dynamic process of planning.

The Sudan has one of the most fertile, vast agricultural areas in the world. The country seems to be at the threshold of a significant breakthrough in development. Agriculture is by far the most dominant sector of the Sudanese economy. It accounts for about 40 per cent of the Gross Domestic Product, and over 95 per cent of the total value of all exports. The labour force operating in this sector amounts to about 85 per cent of the labour force in the country. Until recent years, agricultural development had been taking place at a steady but slow pace due to a number of factors and constraints with which the country has had to contend. However, in view of the considerable resource potentialities the main thrust of development will be made in the agricultural sector of the economy.

Industrial activities at present constitute a relatively minor sector in the economy. Despite the efforts undertaken to promote industrialization, the growth of this sector is still sluggish. It only accounts for about 10 per cent of GDP and employs about 7 per cent

of the labour force. The present government has taken decisions to expand the production of the food and beverage, textile and leather industry groups. Special place was given to the production and refining of sugar. This industry would allow the production of many byproducts, eg yeast for baking and pharmaceutical use, gin, rum and animal fodder. This association in linked processes is congenial for the localization of one type of industrial activity. The country is a major producer of long stable cotton, and hence the government expanded textile industry to be able to provide for domestic consumption. Cotton seeds, sesame and groundnuts offer opportunities for processing edible oils. All these industries reflect the close linkage between the industrial and agricultural sectors in the Sudan.

At this juncture, it has to be emphasised that before any industry can be developed in any part of the Sudan, certain basic physical and social infrastructural facilities have to be made available. In this connexion, following the Stanford Research Institute study in India 'Physical infrastructure includes the ..... facilities directly supporting industrial production and distribution: electric power, road and rail transport, water supply, and sewage and industrial waste disposal. Basic requirements of housing, schooling, and hospital and health services, together with the residential share of refuse disposal, police and fire protection services are covered in social infrastructure."(1) All these facilities, which are part of the "economonizing setting" are central in the process of development.(2)

Needless to say, without a certain minimum of infrastructure

investment, little industrial development can take place. But when such facilities are available on a large scale and are widely distributed throughout a country that can really be called industrial, such facilities cease to be important locational factors. In Great Britain, for example, infrastructural facilities are not of great importance because similar levels are available throughout the country. The study of Cameron and Clark[3] confirmed that the availability of a fully serviced site was of less importance (this of course includes power, water, telephones, road and rail transport, sewage and industrial waste disposal, etc), while the supply of trainable labour was the most important single determinant of area/site choice. Moreover, contrary to the classical location theory, we find nowadays in economically advanced countries, a downgrading in the importance of transportation to a large number of relatively footloose industries. This is attributed to a number of factors, chief among them is the development of the transportation technology which has made it easy to transport goods quickly and often cheaply to any location which is well served with transportation facilities. Equally important is the improvement in the quality of raw materials, as well as the substitution of material inputs which frequently reduces the transportation constraints on activity location. But such arguments may be valid in the case of a developed country where both transportation modes, such as containers, supertankers, pipelines, air cargo, express ways, and technological innovation demoted transportation costs from the sovereign position accorded to them by Weber. However, in the case of a less developed country like the Sudan it is hard to say Weber was in error, as the inadequacy of the transportation system is considered one of the major obstacles to development. Consequently, most firms

in the Sudan are aware of the importance of this factor; and consequently tend to concentrate in Khartoum region which is the only area in the Sudan that is well served by rail, road, river and air transportation. In this way, the markets located in the different parts of the country would be easy to approach from Khartoum and the producers would therefore be able to dispose of their goods in those markets. Other facilities, besides transport, are very limited and restricted in distribution and consequently limit the choice of industrial location.

Thus we reach a point where we can point out that most theories of the locational decisions of firms emphasize only cost and market considerations. They employ a micro approach whose major objective is the determination of the optimum point that maximizes profit. The work of Weber, Plander, Hoover and Losch to mention but a few, was directed towards identifying the point of profit maximization. To visualize location of industry from this angle is too restrictive an approach in determining the effects of the non-economic forces that are often more easily manipulated by the government, and less relevant in explaining the relationship between planning of industrial location and the spatial development of the different regions. One cannot ignore the relationships between the micro theory (which emphasizes the locational decisions of firms) and the macro perspective (which stresses the importance of dispersal of activities over the different regions). According to Friedmann and Alonso[4] problems of regional disparity are locational in character; so too are policy solutions to regional problems. This is true with respect to the Sudan as industrialists prefer to locate in the already developed area of Khartoum. Here

the role of the government comes into perspective by creating other attractive location centres through investment in infra-structural facilities or plants which are both locational in character. Figure 2.6 shows that various factors at the micro level (maximization of sales, satisfactory results, survival, profit motives) and macro level (planning aims, national, regional, maximization rate of growth) are involved; and hence any attempt to determine the relationship between industrialization and spatial development should, therefore, adopt both micro and macro perspectives.

Similar to other developing countries, the pattern of industrial development in the Sudan presents a typical case of limited industrial concentration in the Metropolitan Area of the Three Towns (Khartoum province). Although this area lies away from the sources of raw materials, yet the basic services and facilities needed by industry are available on a reasonable scale. To be more specific the phenomenon can be explained by the following:-

(1) The basic theme of the "Approved Enterprises (Concessions) Act" passed in 1956 was granting concessions. It did not specify strategies or objectives for industrial development, nor did it consider the problem of location. It is no exaggeration to suggest that the industrial sector fell into the hands of the private sector and was developing only through incentives but without directives. In short, the Act as it stood, did nothing that could induce producers to locate in other regions of the Sudan. The other Act which

followed did nothing to encourage industrialists to move to other regions outside Khartoum. Grants have been obtained by enterprises irrespective of their location.

(2) Comparative developed infrastructural facilities in the Khartoum area attracted industrial investment. Needless to say, infrastructure has an important and positive role to play through its capacity to provide a 'basis' for urban development and a unique environment to attract industries. Unfortunately, the Sudan remained until recently with a very narrow and almost zero infrastructural base outside Khartoum region.

(3) Industrial enterprises are very much market oriented. Perhaps the most striking feature of government industrial policy in the Sudan has been the failure to set a clear industrial strategy. This resulted in an ad hoc growth of industries producing non-essential products of low quality and high costs. Undoubtedly, the market in Sudan, as other developing countries, could be described as narrow in the sense that the purchasing power of the population is low. Among the working population there is more money available in Khartoum area that can be spent on factory products as well as other goods and services. This is why producers would like to locate their industries as near as possible to the Three Towns.

(4) Industrial enterprises explored the possibility of using external economies by establishing inter-industry linkages. Some industries, such as packing, bottling and maintenance, may flourish because they find a market for their products within the industrial area. Studies have shown that, where towns are closely situated to one another (ie, the Three Towns) there is a greater degree of specialization of smaller range of industries to exploit economies of scale from the close linkage. Florence gives support for this swarm tendency.

(5) Centralization of planning and policy organs in the capital city encouraged clustering of industrial investments in the Three Towns. In a vast country like the Sudan, where the means of communication are slow and inadequate, there is always the fear of losing contact with the authorities in the capital city of Khartoum (with hardly any effective branches elsewhere).

A number of points emerge in the course of discussion of the above phenomena. First, some of the factors can be considered as policy issues, as development acts and centralization of policy organs in Khartoum (the first and the last variables) fall within the domain of the industrial policy issues. Secondly, other factors are of purely commercial nature. That is well justified hence the prime motive for investment in the private sector is to secure continuity of project operation and profit making. This issue is reinforced

when uncertainty is introduced. It becomes not solely a locational issue; rather it is a question of what types of organizations take the key decisions - national investors, foreign investors and so on. It is also part of the social structure, as has been put by Weber "Location theory is a theory where firms survive, and as such makes assumptions about the behaviour of society as a whole, rather than merely about the entrepreneur who is making the decision."(5)

Thirdly, the relationship between infrastructure and development is not unidirectional; rather it is reciprocal. Without some basic infrastructure services, no development can be hoped for. However, the availability of infrastructure alone does not guarantee development as other important factors come into play.

At this juncture it is important to reiterate one major concern of the study: What key policy reforms are required for a more effective industrial locational planning in the Sudan? The Sudan, as in the case of other developing countries, suffers from the poorly integrated spatial structure which has threatened, and is still impairing, its national fabric. The recent war in the Southern region of the Sudan illustrated that the unbalanced investment patterns were among the factors that have instigated the open conflict with the central government. The core-periphery model suggested by Friedmann(6) holds true for the Sudan as the Three Towns (Khartoum, Khartoum North and Omdurman) are growing at the expense of the nation. So the present government is entrusted with the responsibility of correcting the lopsided situation and giving a fair share of the national cake to the different regions of the country.

This can be achieved when the following principles are given due attention: Firstly, regional development and hence distribution of industry should depend upon the degree of development in the different regions and their factor endowments (both human and natural resources; existing and potential). Secondly, regional planning can only be achieved in the presence of competent regional planning organs, which continuously conduct regional studies with the aim of identifying viable industrial investment opportunities in the region. Thirdly, socio-economic results of regional development can only be achieved when regional planning is in complete harmony and consistent with national plans.

It must be made clear at this point that we are not advocating total dispersal of industrial location; and that the issue at hand is not concentration versus dispersal; rather it is how to strike the right balance between the two. This calls for a flexible approach to planning of industrial location which takes account of two important aspects:-

The first is the expansion of the industrial base in key cities in areas suitable from an economic point of view, with comparative advantages of infrastructural facilities which the government could improve without incurring heavy costs. This calls for a much more articulated investment pattern which defines areas as well as types of services that should receive priorities in the allocation of resources. The provision and/or consolidation of basic services such as road networks, power lines, education and health facilities should be planned in close correspondence with the policy of planning

of industrial location. Preferential treatment (both concessions and exemptions) to industrial investment should take into account the degree of development of the region in which the investment is to be located. Exemption and concessions granted should have a reverse relationship with the degree of development. The Puerto Rican experience can be considered as a case in point; no concessions were granted to any investment activity to be located in the Metropolitan Area, namely San Juan and San Toris. In connection with the above, one hopes to see the emergence of industrial centres in WadMedani, PortSudan, Atbra, New Halfa, Kassala, Kosti, El-Hasaheisa, Sennar, Wan and Juba. Development in these centres will help to absorb a significant proportion of the rural outflow as well as promoting growth.

The second aspect of the locational policy emanates from the fact that the Sudan is and will remain an agricultural country. More than 80 per cent of the population lives in rural areas. It is obvious therefore, that 'trickling down' or 'spread effects' of the above policy will not make a positive impact in the lives of those who are scattered all over the country. This calls for the establishment of rural development centres; though agriculture will be the centre of activity, in many cases handcrafts and small industries will be of increasing importance. It is worth mentioning that the present government machinery is concentrating in key development issues, and hence there is a lack of (a) specialist technical advice and financial services available to rural sectors (b) any focal point to which small and medium scale private entrepreneurs, particularly in rural areas, could turn for assistance.

The domestic banking system is poorly-equipped to provide development assistance to rural sector in terms of either long term finance or technical and managerial support. The Bank of Sudan undertakes normal Central Banking functions. The commercial banks concentrate on short-term lending to finance external trade, and to a lesser extent, the working capital needs of major industrial ventures. Even the main specialized banks, which were established to cope with the special problems of providing finance for industry, are plagued by shortage of resources and technical manpower to provide effective advice. Therefore, most of their activities are concentrated in a few urban centres.

Moreover, the great national resource potential of the country has also attracted a wide array of other financial institutions drawing on Arab Funds. Some are geared to channel concessionary assistance to infrastructure and agricultural projects within the public domain. Others are searching for participation in commercially viable projects under both public and private control. None, however, provides comprehensive assistance to rural enterprises.

The above arguments call for the creation of a government body capable of delivering the comprehensive package of financial and technical services required by small and medium scale rural enterprises. Although the creation of this body would inevitably give rise to additional overhead costs such a step is necessary to provide an effective delivery mechanism for the type of assistance required in the rural sector. The benefits are commensurate with the costs involved. Firstly, there exists

among rural small business in the Sudan a substantial wealth of craft skills and entrepreneurial talent which can contribute significantly to the country's development efforts and counter the shortage of skills and management personnel in the major business sector. Secondly, the growth of the rural enterprise would spread the benefits of economic development. Thirdly, it would help to offset the serious logistic problems which exist, because of infrastructural deficiencies, by creating more local production and services; and fourthly, it would contribute to the major social objectives of employment creation and improve income distribution advocated by the government in its development plans.

With respect to the last objective, the study pointed out the required basic change in the structure and mechanism of the decision making process in the field of planning of industrial location. The classical assertion that one decision making unit applying one micro-criterion is no longer valid. The planning of location must therefore, be viewed as a result of a multi-stage and comprehensive process, rather than an isolated event. The problem is not solely economic, but equally sociological factors must be recognized. Perhaps one agrees with Florence that industrial sociology is one of the most rapidly growing social sciences presenting new approaches in the field of industrial location(7). This calls for sociological studies analyzing the social consequences of industrial location implemented in regions with different social fabrics.

9.2 Suggestions for Future Research

There are some interesting issues, the discussion of which lies beyond the scope of this thesis. It is our belief that future

research is needed, at least in the following areas:-

(1) A cross-cultural study to investigate the extent and operating parameters of decision making within manufacturing firms with respect to spatial location in UK and the Sudan (developed versus developing country). Since the sequence involved in such a decision is part of an on-going strategy and could not operate in a vacuum, the study should seek to trace the influence of external environmental factors on the firm's locational decision making in addition to those from its internal environment. The work of Negandhi could be used in identifying pairs of firms in the two countries similar in technology products, size, and ownership. The major parameters to be investigated are:

(a) The position of the decision making process within the general investment policy of the firm.

(b) Personal involvement in the decision-making process.

(c) What methods are used to gather information?

(d) The importance of the locational decision. This involves analysis of the lead time in the two countries.

(e) In what way the politics of the organizations modify decision makers' perceptions of opportunities and threats.

(f) The impact of environmental differences (firms' internal and external environments) on the different stages of the location decision.

(2) A lot of discussion is now in the pipeline concerning the establishment of an Arab Common Market. Most Arab countries recognized the restrictive influence of state frontiers in the process of development. Consequently, various Arab institutions were established in order to promote the integration of national economies. The possibility of abolishing trade barriers increases the market areas of plants and creates new locations. According to Isard "Location cannot be explained without at the same time accounting for trade and trade cannot be explained without simultaneous determination of locations".(8)

A new framework for the consideration of the problem of industrial location is, therefore, sought. With this in mind, two questions need an in-depth investigation:

(1) To what extent is the number of new industrial locations in Arab countries affected by the existence of a common market?

(2) To what extent do the new industrial locations influence the trends of spatial concentration and dispersion?

Inevitably, this study involves a consideration of the similarities and differences in environmental factors between different countries and the impact of such factors on the effectiveness of locational policies.

9.3 The Research in Retrospect

The study launched showed that planning of location is not an isolated event, as social, economic and cultural considerations must be taken into account. It is part of the larger problem of regional planning which is partly concerned with cutting down of cost of production, spreading the rate of growth of national economy and making possible a proper economic balance between the various regions. Little attention has been paid, hitherto, to the problem of industrial location planning in the Sudan. The lopsided distribution of industries had adversely influenced income distribution and the relative standards of living in different provinces.

It is hoped that the findings of this study will be of use to planners in the Sudan in adopting a dynamic approach to industrial location and regional planning. It is also hoped that such a study would increase the existing scanty literature dealing with the Sudan.

Notes and References

NOTES AND REFERENCES

CHAPTER ONE

(1) Bhagwati, J. The Economics of Underdeveloped Countries. World University Library (New York: McGraw Hill, 1966) p 9. It is difficult to find a precise definition to the word 'underdeveloped'. Bhagwati illustrates the point vividly: "The poor nations are variously described as 'backward', 'underdeveloped' and 'developing'. The choice of word depends largely on the sensitivity of the audience and the sensibility of the analyst. Ironically, it is the most emotive word, 'backward', that gets closest to the essence of their problems." p 9.

(2) For more detailed analysis of the characteristics of underdeveloped areas, see the work of Professor H Leibenstein: Economic Backwardness and Economic Growth. New York. 1957.

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CHAPTER FOUR

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In 1913 the British Parliament debated the loan by the British government to the Sudan government. One of the participants said, "Experiments have abundantly proved that the Sudan is not the finest cotton growing country in the British Empire, but, what is more important, that it can grow that sort of cotton Lancashire requires. This is a subject of vital importance to the textile North, and it is essential that the millions engaged in and dependent on the Cotton Industry should no longer be at the mercy of bad seasons in India or North America. If the shortage of raw material is to

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Northern province was split into Northern and Nile provinces; Darfour and Kordofan provinces were split into Northern and Southern sections; Blue Nile province was divided into Gezira, White Nile and Blue Nile provinces.

The divisions pre and post 1974 are as follows:

Pre 1974	Post 1974
(1) Northern	(1.2) Northern and Nile
(2) Red Sea	(3) Red Sea
(3) Khartoum	(4) Kassala
(4) Blue Nile	(5) Khartoum

Pre 1974		Post 1974	
(5)	Kordofan	(6,7,8)	Blue Nile, White Nile, Gezira
(6)	Darfour	(9,10)	Northern Kordofan and Southern Kordofan
(7)	Bahr el Ghezal	(11,12)	Northern and Southern Darfour
(8)	Equatoria	(13)	Bahr el Ghazal
(9)	Upper Nile	(14)	Equatoria
		(15)	Upper Nile

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(20) This figure excludes approximately one million cattle-herding nomads who move in response to variations in rainfall. The question of what constitutes a nomad poses real problems for census-takers and analysts of labour market developments. See United Nations: Population Growth and Manpower in the Sudan, A Joint Study by the United Nations and Government of the Sudan Population Studies, No 37. New York. 1964. pp 139-140.

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CHAPTER FIVE

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(2) Food and Agriculture Organization of the United Nations, Perspective Study of Agricultural Development in the Democratic Republic of the Sudan - Statistical Annexe, Rome, April 1973. p 3.

(3) UNIDO, Industrial Development Survey, 1974. p 264. It was indicated that 70 per 100,000 population in 1966 were pursuing higher education.

(4) National Income is computed on fiscal rather than calendar years.

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(8) The following table gives a breakdown of the agricultural sector by various crops:

Item	% of G.D.P.	% of Agric.
1 Cereals	15	39.4
2 Cotton and Cottonseed	13	34.2
3 Oilseeds, nuts and kernels	4	10.6
4 Vegetables	4	10.6
5 Pulses	1	2.6
6 Miscellaneous	1	2.6
	38	100.00

Source: G. Harvie and J. Kleve, The National Income of the Sudan 1955/56. p 81.

(9) National Income Section, Department of Statistics, Khartoum.

(10) The industrial sector, includes besides manufacture, mining, and public utilities.

(11) Strict anti-inflationary measures and increases in supply conditions resulted in stabilization of prices since that time. By October 1976, the price index for lower income

salaried staff in the Khartoum level was at the same level as for June 1975.

(12) National Income Accounts Section. Ministry of Finance and National Economy. Khartoum. 1977.

(13) In fact, a significant portion of external financing has been provided for consumer imports and general balance of payments support. This has freed some of the government's foreign resources.

(14) Bank of Sudan, Khartoum.

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(17) Ibid. pp 6-7.

(18) The agricultural sector includes farming, forestry, livestock and fishery production.

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(28) Economic Survey. Ministry of Finance and National Economy. Khartoum. 1976/77. pp 26-27.

(29) Ibid. p 28.

(30) Ministry of Agriculture, Food and Natural Resources. Khartoum. Sudan.

(31) General Planning and Economic Studies Administration. Economic Survey 1971. Democratic Republic of the Sudan. p 11.

(32) In his study of Industry in Africa, A.F. Ewing groups the Sudan among those "Small countries where industrialization can hardly be said to have started." This is in contrast to a second group of countries where a range of industry has been initiated, and a third group of countries where there is a significant development of intermediate and capital goods production. Ewing, Industry in Africa. Oxford University Press, 1968. pp 24-25.

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(37) (1) The first known budget in the history of the Sudan was made in 1899. The General Budget is classified into three Chapters or Sections:

Chapter I: Personnel, Chapter II: Services,
Chapter III: Extra ordinary Expenditure, eg, expenditure on durables or non-recurrent spending.

(2) Recently Chapter III has disappeared as it has been combined in the development budget.

(38) Bank of Sudan, Khartoum.

(39) Ibid.

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(42) Economic Survey. Ministry of Finance and National Planning. 1974. p 144.

(43) Bank of Sudan. Quarterly Bulletin. Vol 16. No 2. pp 33 and 51.

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(18) At present, work started on four major roads which will connect and link the various southern provinces with each other and with Juba and link these provinces with river and rail terminals. Two of these roads, apart from their regional and national purposes, will provide connexions with Uganda and Kenya, thus making it possible to have an additional outlet to the sea. The major roads under construction are:

(1) Juba-Nimuli (200 km) is to be an all-weather gravel road. It links the southern regions with Uganda.

(2) Wan-Juba (850 km). It passes through rich agricultural land and links southern provinces with the rail terminal at Wan and the river terminal at Juba.

(3) Juba-Torit-Kapoeta (320 km) which is expected to be extended to the Kenyan border.

(4) Rumbek-Yerol-Shambi (180 km) links the lakes and Jongli provinces and ensures all-weather traffic in an area which used to be completely isolated by swamps.

(19) River Service Corporation. Khartoum.

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(21) Ministry of Finance: Economic Survey. Khartoum. Sudan. 1972.

(22) Galenson, W and Pyall, G. The Quality of Labour and Economic Development in Certain Countries. International Labour Office. Geneva. 1964.

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Primary education		6 years
Secondary education		
- general	3 years	
- high	3 years	6 years
TOTAL		12 years

(25) For an excellent discussion for the incidence, causes and control of absenteeism in the Sudan textile industry, see Taha, A.E.A. "A Report on Absenteeism in the Sudan Textile Industry Limited". National Council for Research. Khartoum. Sudan.

(26) According to Hoover, external economics have three elements (a) large scale internal economics which takes place within each single firm, (b) localization economics which is gained by firms categorized in a single industry in a single geographical location, (c) urbanization economics, ie, economics that occur for all firms in all industries at a given location. See Hoover, op. cit. pp 120-121.

(27) Pred, A. The Spatial Dynamics of US Urban-Industrial Growth 1800-1914. pp 5-6.

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(2) The Enterprise Zones are:(a) The Isle of Dogs in London's Dockland, (b) Salford Docks and Traford Park in Manchester, (c) Speke on Merseyside, (d) Parts of Newcastle and Gateshead, (e) Clydebank, (f) the lower Swansea Valley, (g) Inner Belfast. The companies within the zones will benefit from (i) exemption from Development Land Tax, (ii) exemption from all rates on industrial and commercial property, (iii) 100 per cent capital allowances for commercial and industrial buildings, (iv) simplifying planning procedures, (v) exemption from the need for industrial development certificate, (vi) exemption from Industrial Training Board requirement, and (vii) faster customs facilities.

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(7) The factories were as follows:- Two sugar factories, three canning factories, a milk dehydration factory, an onion dehydration factory, a tannery and a cardboard factory. See: Ministry of Finance and Economics: The Ten Year Plan of Economic and Social Development 1961/62 - 1970/71. Khartoum. 1962 p 117.

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(20) There is no accurate census of small scale industries in the Sudan. According to sporadic government reports there were a reported 20,000 small scale production plants in 1974. The small and larger industrial activities together were reported to employ around 3.7 per cent of the active population.

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Appendices

APPENDIX A

University of Bath

Claverton Down
Bath BA2 7AY

Telephone Bath 61244
(STD code 0225)
Telex 449097

School of Management

Professor I L Mangham
Professor R E Thomas
Professor C R Tomkins

15 August 1979

Dear Sir

The School of Management at this University is engaged on research on (a) problems of regional growth, including the location of business enterprises, and (b) the specific management problems of developing countries, including the extent - if any - of transferability of experience from developed to developing economies.

Mr Agabawi is a doctoral student sponsored by his University in the Sudan whose project is under my direct supervision. His specific interest is the role of location of industry planning in his country. It would be of great value to his study if you could assist him in the collection of data. This he intends to do by personal interview.

The results of such interviews will be summarised eventually in his thesis, but we would naturally respect your requirements as to the confidentiality of data, either by restriction on access to the data for a period of years, or in some other normally acceptable manner.

Given the importance of his study and this assurance I trust that you can give him every assistance.

The dates and times of interviews can be arranged by yourself so that the inconvenience caused is minimised. Mr Agabawi can be contacted in the University of Gezira, P.O. Box 2667, Khartoum. Tel. No. 45335, OR P.O. Box 20, WadMedani. Tel. No. 2605.

Thanking you in advance.

Yours sincerely

Professor R E Thomas
(Supervisor)
Head of School of Management

E A Agabawi
(Researcher)

University of Bath

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School of Management

Professor I L Mangham
Professor R E Thomas
Professor C R Tomkins

١٩٧٩/٨/١٥

السيد /

تحية طيبة ،،

درجت كلية الادارة بجامعة باث القيام بابحاث فى مجالات عديدة منها على سبيل المثال (أ) المسائل الادارية الخاصة بدول العالم الثالث وامكانية الاستفادة من تجارب الدول المتقدمة فى تطوير الادارة فى الدول النامية.
(ب) كيفية اتخاذ القرارات المتعلقة بالتنمية.

السيد عقباوى مبعوث جامعة الجزيرة والذى يعمل تحت اشرافى المباشر لنيل درجة الدكتوراه يدور بحثه حول اهمية وكيفية التخطيط واثر السلوك الادارى فى اتخاذ القرارات المتعلقة باختيار المواقع المناسبة لاوجه العمل المختلفة - وعليه نرجو التكرم بابداء التسهيلات الممكنة والمعاونة فى العمل على جمع المعلومات المطلوبة والتى سيطلبها الباحث خلال مقابلاته الشخصية معكم.

الجدير بالذكر ان نتائج هذه المقابلات ستلخص فى اطروحته ، واود ان اشير هنا اننا سوف نلتزم بسرية المعلومات التى ستقدمونها ان رغبتم فى ذلك ، اما عن طريق منع تداول البحث لاى عدد من السنين او اى طريق مناسب آخر.

لاهمية البحث والذى نتوقع منه نتائج مفيدة نحن على ثقة بانكم سوف لا تألون جهدا فى تقديم كل مساعدة ممكنة.

وسوف يترك لكم حرية تحديد مواعيد اجراء المقابلات تفاديا للمضايقات التى قد تنجم كما يمكن الاتصال بالسيد عقباوى عن طريق العنوان التالى :

جامعة الجزيرة ص.ب. ٢٦٦٧ الخرطوم ، تلفون ٤٥٣٣٥
او جامعة الجزيرة ص.ب. ٢٠ ود مدنى ، تلفون ٢٦٠٥ .

ولكم الشكر اجزله واوفره.

بروفسير ر . أ . توماس.
المشرف على البحث ورئيس
كلية الادارة.

APPENDIX C

Interview Guide for the Study

School of Management

University of Bath

Industrial Location in Developing

Countries with Special Reference to the Sudan

Interview Guide for the Study

SEPTEMBER 1979

Academic Supervisor : Professor R E Thomas

Researcher : E A Agabawi

Attached : Introductory letter from Professor R E Thomas

Researcher's Address: University of Gezira

P O Box 2667 Khartoum

SUDAN

INTERVIEW GUIDE

1. Name of Company _____

2. Address _____

3. Industry to which it belongs _____

4. Date of starting production _____

5. Main products _____

6. Size of Company

(a) Staff

(i) Accounting _____

(ii) Personnel _____

(iii) Sales _____

(iv) Purchasing _____

(v) Services (Planning, Production Control, R & D, and General Office _____

(vi) Workers _____

Total _____

(b) Total Assets _____

(c) Importance of the following costs (%) (if possible)

Labour _____

Raw materials _____

Transport _____

Other overheads _____

7. What is the total area in square metres? _____

8. How did you finance this project:

(a) Internal Resources? _____

(b) External Resources? _____

(c) Other? _____

9. Does this firm produce its products for:

(a) a strictly local market _____

(b) a general market (outside the province) _____

(c) exports _____

10. How would you assess the prospects in your industry over the next five years:

(i) Get better _____

(ii) Get worse _____

(iii) Same _____

(iv) Give reasons if possible

11. During the past year would you say the business was:

(i) Good _____

(ii) Fair _____

(iii) Poor _____

12. What are the major problems facing your business?

13. Have the operations of this factory always been here or were they moved from somewhere else:

(a) Moved here _____. If so, from where? _____

(b) Always been here _____

14. Where are your competitors located?

15. Has there been much change in the location of your competitors over the last 10 years or so:

(a) Yes _____

(a1) What kind of location changes have there been?

(a2) What are the main reasons for these location changes?

(b) No _____

(b1) Speaking of the location of this plant in Khartoum, what are the advantages of locating in this province over other provinces?

16. What are the main disadvantages of this province to locate your factory compared to other provinces?

17. Considering the site of your factory here in Khartoum area, what would you say are the main advantages of being located here rather than in some other sites in this province?

18. When did you first think about this project?

19. What were the pressures to the decision threshold?

20. What was the location decision making process?

21. What sources of information were used to gather data at the different stages of the decision-making process?

22. Are there any minimum requirements which must be met for locating factories in this industry:

(a) Yes _____

(a1) What are these

(b) No _____

23. Were you influenced by the Government in making the decision?

If yes, how?

24. Here is a list of factors regarding location. Which five factors do you regard as the most important?

(1) Availability of skilled labour

(2) Availability of trainable labour

(3) Labour relations

(4) Wage rates

(5) Marketing facilities

(6) Accessibility to materials

(7) Transportation facilities (rail, water or air)

(8) Personnel transportation

(9) Supply of water

(10) Supply of power

(14) Fully serviced site

(15) Availability of technical education facilities

(16) Nearness to government offices

(17) Finance

(18) Environmental requirements

(19) Housing

(21) Others (specify)

25. What were the number of sites considered? _____

26. Was the first feasible site chosen? _____

27. How long did the search process take? _____

28. It has been argued that good community relations, favourable industrial climate, recreation facilities, good schools, are important things in locating a plant. Do you consider these community factors:

    (a) more important _____

    (b) equally important _____

    (c) less important _____

    than the distance to markets or materials?

29. Some people nowadays talk about the satisfaction or dissatisfaction with things like education, recreation opportunities, safety, housing etc (ie quality of life). Do you think the quality of life in Khartoum during the past decade has improved, worsened, or stayed about the same?

    (i) Better now _____

    (ii) Worse now _____

    (iii) Same _____

30. Would you please give an example?

31. How would you relate the quality of life in the province with other provinces in the Sudan:

    (a) Better in this province _____

    (b) Worse in this province _____

31. (Cont)

(c) Same _____

32. Can you name other provinces where the quality of life is much better than that of Khartoum?

33. How much do the following things affect the operation of your business:

(a) Absenteeism - Great deal _____

Somewhat _____

Not at all _____

(b) Inadequate transportation for employees -

Great deal _____

Somewhat _____

Not at all _____

(c) Racial problems -

Great deal _____

Somewhat _____

Not at all _____

(d) Will you tell more about these problems?

(f) Can you think of any province in the country where the situation may be better?

34. Over the past decade have there been any significant changes in the location of your:

(i) major suppliers

(ii) major customers

(a) Yes

(b) No

If (a), what kind of location changes have there been?

35. Have you expanded your buildings, machinery etc during the past 10 years:

(a) Yes _____

(b) No _____

If (a), what are the main reasons for this expansion?

36. Does your company have any factories outside the Khartoum area:

(a) Yes _____

(b) No _____

37. Could you increase production with your present facilities:

(a) Yes _____

(b) No _____

If (a), what is the percentage increase in production?

38. If the Government is attempting to persuade plants to relocate in other provinces, which attractive characteristics should be emphasised?

39. Which of the following do you think will be more effective in attracting factories to new development areas:

(a) (a) More infrastructure _____

(b) Tax concessions _____

(c) Development loan _____

(d) Low rent _____

(e) Others (specify) _____

40. Have you had any information about the conditions and labour costs in your industry in other provinces:

(a) Yes _____

(b) No _____

If (a), what were your sources for this information?

41. Have you tried to look for or obtain information from other provinces relevant to your business:

(a) Yes _____

(b) No _____

If (a), what kind of information did you get?

42. In a location decision you presumably attempt to reduce risk. How do you feel that collecting more information on possible sites would help you in making the final decision?

(a) Give example if possible

43. Regarding highly trained or professional personnel (engineers, accountants, etc), do you originally use:

(a) many _____

(b) some _____

(c) very few _____

(d) none _____

44. Have you encountered any difficulty getting skilled or semi-skilled workers for your plant:

(a) Yes _____

(b) No _____

If (a), which skills in particular?

What difficulties have you faced?

45. Do you anticipate using new production, business or research methods in the foreseeable future:

(a) Yes _____

(b) No _____

If (a), what types of specialists or technicians would they probably be?

45. (Cont)

Do you anticipate difficulty in obtaining these people?

What kinds of problems do you anticipate?

46. What would you say was the probability of relocating this factory in another province:

(a) Very probable _____

(b) Somewhat probable _____

(c) Not very probable _____

(d) Out of the question _____

(i) If you were to relocate, what location would be most likely?

(ii) What would be the advantages of that location?

(iii) When?

47. If you could start from the beginning do you think you would locate where you are or in some other area:

(a) Some other area _____

(b) Where factory is now sited _____

If (a), where would you relocate

47. (Cont)

What factors would make the location better than this one?

48. Are there any plans for the expansion of the facilities of this plant, such as large increases in machinery or additional buildings:

(a) Yes _____

(b) No _____

If (a), when might this expansion take place?

Could you mention the main reasons for this expansion?

49. Are there any plans for expanding production in the Khartoum area through creation of facilities outside this plant:

(a) Yes _____

(b) No _____

If (a), when might this expansion take place?

What would be the main reasons?

50. Do you feel that there are unused facilities in the Khartoum area that you could use if you were to expand:

(a) Yes _____

(b) No _____

51. Are you planning to expand your facilities outside Khartoum province?

(a) Yes _____

(b) No _____

If (a), what provinces will you look for?

Any reasons why expansion will be located there?

52. What is your Company's share of the market? Is it larger or smaller than the last decade?

(i) Larger now _____

(ii) Small _____

(iii) Smaller _____

53. As to changes in the operations of this business during the past years, have you gone into any new products that you did not manufacture when you first started the business:

(a) Yes _____

(b) No _____

If (a), what types of products are there?

53. (Cont)

Where are the competitors of these products located?

Does your location in Khartoum province offer any advantages in the production of these products or does it make no difference?

If so, what are the advantages if any?

Have you encountered any difficulties in recruiting engineers, professional and skilled workers for producing new lines and products:

(a) Yes _____

(b) No _____

If YES, what skills in particular were a problem?

54. Does your factory serve any geographical areas now that you did not serve in the past:

(a) Yes _____

(b) No _____

If YES, what areas?

55. What types of firms and institutions are you able to contact in this province?

56. How is it convenient to make these contacts?

57. Finally, would you say that your firm would locate where profits would be maximized?

APPENDIX D

STRUCTURE OF INDUSTRY

A Food and Tobacco

(1) Sugar Processing

(2) Confectionery Processing

(3) Flour Milling

(4) Soft Drink Processing

(5) Cigarettes and tobacco

(6) Bakery Products

(7) Edible Oil (cotton seeds, groundnuts, sesame)

(8) Food Canning

(9) Dairy Products

(10) Brewing, blending of alcoholic drinks

(11) Animal Feed

B Textiles and Leather

(12) Cotton textile industry

(13) Leather tanning and fabrication

C Wood and paper products

(14) Sawmilling and wood products fabrication

(15) Furniture

(16) Paper and paper products

D Non Agricultural manufacturing and fabrication

(17) Pesticides and medicines processing

(18) Basic industrial chemicals

(19) Plastic industries

(20) Cosmetic processing

(21) Glass

(22) Rubber industry

(23) Cement

(24) Paints

(25) Metal fabrication

(26) Petroleum refineries

(27) Other chemical industries

E Service Industry

(28) Printing and publishing industry

(29) Small-scale car and machinery repair

(30) Mechanical workshops

(31) Sudan Railways repair shops

(32) Water processing and electricity generation

APPENDIX E

EXECUTED, ON GOING AND NEW PROJECTS:

ROAD AND TRANSPORT SYSTEM

Name of Project	Estimated Cost (m)		Remarks
	Total	Foreign Exchange Cost	
Gedaref-Kassala Road	30	17.5	Finished
Kassala-Haiya Road	46	35.4	Finished
Haiya Port Sudan Road	37.7	23.0	Finished
Wad Medani-Sennar Kosti	25.5	10	Under construction
Kosti Bridge	14.1	7.6	Finished

The Khartoum PortSudan Road connects the major population and production centres with PortSudan which is the only outlet to the international market. Commodities produced or consumed in these centres are of high value and are transported by road, e.g. ginned cotton, oil seeds, edible oils, sugar and gum arabic. It also connects a number of important feeder roads; eg El Dueime - Wad Medani, Sennar - El Suki, El-Hawata - Gedanef. Besides joining the production and administrative centres, it offers important service to the largest agricultural schemes in the country. The Khartoum - PortSudan road consists of five links (a) Khartoum - WadMedani (1978 Km), (b) WadMedani - Gedaref (227 Km), (c) Gedaref - Kassala (220 Km), (d) Kassala - Haiya (350 Km), (e) Haiya - PortSudan (207 Km).

The new projects for which feasibility studies are now in progress are:

(1) Nyala - Kas - Zalingei road (210 Km)

(2) Sennar - Damazin road (240 Km)

(3) Jebel Aulia - Kosti road (260 Km)

In the southern region of the country work started on four major roads which will connect the various southern provinces with eachother and will link them with river and rail terminals. Two of these roads will link the country with Kenya and Uganda. The roads are:

(1) Juba - Nimuli (200 Km). This links The Sudan with Uganda.

(2) The Wan - Juba (850 Km). This road passes through rich agricultural lands and connects it to the rail terminal at Wan and the river terminal at Juba.

(3) Juba - Tosit - Kapoeta (320 Km). This is expected to link Sudan with Kenya.

(4) Rumbek - Yerol - Shambi (180 Km).

APPENDIX F

CAPACITY UTILIZATION IN SOME SELECTED FACTORIES

Factory	Description of product	Unit of measurement	Capacity	Output as % of capacity 1979/72	1972/73	1973/74
Food and related industries						
Khashm et Girba : Sugar factory	Sugar	Thousand tons	60	105	118	126
Guneid : Sugar factory	Sugar	Thousand tons	60	47	70	75
Wau : Fruits and vegetable canning	Canned fruits and vegetables	Thousand tons	11	5	10	10
Karima : Fruits and vegetable canning	Canned fruits and vegetables	Thousand tons	11	9	10	13
Karima : Dates	Processed dates	Tons	400	37	89	27
Kassala : Onion Dehydration	Dehydrated onion	Tons	900	17	19	54
Babanousa : Milk Products	Milk products	Tons	575	6	14	15
	Karkadi powder	Tons	300	27	71	33
	Gum arabic	Tons	200	107	59	104
The Blue Nile Brewery	Beer	Million litres	8.15	93	103	103
Aybes National Corporation	Sherry	Million litres	3.18	71	88	106
National Distilling Corporation	Sherry	Million litres	7.90	100	121	
Ice and Lemonades	Ice	Thousand blocks	150		87	71
	Lemonade	Thousand dozens	180		94	95
Flour Mills Corporation	Wheat flour	Thousand tons	120	86	73	72
Rea : Sweets	Sweets	Tons	3 600	71	55	42
Krikab : Sweets	Sweets	Tons	2 700	36	34	41
Rubak Oil Mills	Oil and Cakes	Tousand tons of cotton seed	30	56	61	65
African Oil and Soap Corporation	Oil, cakes and soap	Thousand tons of cotton seed	60	61	60	60

CAPACITY UTILIZATION IN SOME SELECTED FACTORIES (Cont.)

Factory	Description of Product	Unit of measurement	Capacity	Output as % of capacity 1971/72	1972/73	1973/74
Sudanese Oil Corporation	Oil, cakes and soap[1]	Thousand tons of cotton seed	60	78	44	43
Sudan Soap Factory	Oil, cakes and soap[1]	Thousand tons of cotton seed	27	65	73	58
Tea packing	Packet tea	Thousand cartons	90	65	33	
Shoes and leather						
Bata Nationalised Corporation	Shoes[2]	Million pairs	14.7	54	44	29
Omdurman : Shoes and Leather	Shoes[2]	Thousand pairs	240		18	11
	Hard leather[3]	Thousand pairs	75		46	35
Khartoum : Tannery	Soft leather	Million sq. metres	2.2	132	89	
Industrial Materials						
Maspio : Cement	Cement	Thousand tons	80	81	82	85
The Nile Cement Corporation	Cement	Thousand tons	100	42	56	50
Ingassana Hill Mine Corporation	Chrome ore	Thousand tons	100	28	18	15
Domestic products						
The Modern Laundry Blue	Laundry blue	Thousand tons	45	61	58	52
The El Taheer Perfumery (Khartoum)	Perfumes	Thousand tons	188	58	61	69
The El Taheer Perfumery (Omdurman)	Perfumes	Thousand tons	292	74	70	

[1]In order to obtain an indicator of the use of capacity the weight of all products has been divided by the capacity as measured by the weight of oil seek processible. [2]The measures of capacity and output include shoes of various types. [3]Other products in addition to leather are also manufactured. Source: Ministry of Industry and Mining.

APPENDIX G

EXISTING DEVELOPMENT INSTITUTIONS

Introduction

1. This Appendix contains additional information on some of the key Sudanese finance institutions and a list of the main non-Sudanese institutions operating in the Sudan.

Sudanese Financial Institutions

2. A detailed list of branches of the Agricultural Bank and the five Commercial Banks is given in Table 1.

Non-Sudanese Development Institutions

3. The following list indicates the principal bodies identified by the Task Force as being currently involved in rural development in the Sudan:

Arab Fund for Economic and Social Development

Arab Authority for Development and Agricultural Investment

The Faisal Islamic Bank

The Islamic Development Bank

Arab Africa Bank

Arab Investment Company

The World Bank

The United Nations Development Programme

The European Economic Community

The Arab Organisation for Agricultural Investment

The Ford Foundation

4. It should be emphasised that this is not a comprehensive list but merely serves as an indication of the number of major institutions involved in the Sudan. A very brief indication of their respective activities is given overleaf.

Arab Fund for Economic and Social Development

5. The Kuwait based AFESD is currently the largest single source of finance for public sector projects mainly in infrastructure and agriculture. Its operations in the Sudan are co-ordinated by a section within the Ministry of National Planning. The Fund does not provide finance for private projects.

Arab Authority for Development and Agricultural Investment

6. As a result of studies sponsored by AFESD and other Arab Funds, an Arab Authority for Development and Agricultural Investment is currently being established in Khartoum with resources of $1400 million. The Authority will sponsor public projects falling within the scope of an ambitious ten year development programme costing L$ 1553 million for agricultural, forestry, livestock and agro-industry projects and L$ 734 million for supporting infrastructure.

The Faisal Islamic Bank

7. This new bank has currently been established with an authorised capital of L$ 6 million of which a quarter is initially paid up. The bank will provide assistance on an equity basis to small and medium scale ventures.

The Islamic Development Bank

8. This major Arab Bank, whose head office is in Jeddah, aims to

encourage economic development in Islamic countries in accordance with the teachings of Islam. It is an important potential source of funds but will not be directly involved in promoting or assisting projects.

Arab Africa Bank

9. This Bank, with headquarters in Cairo, has provided commercial loans to a number of major development projects in the Sudan through its Khartoum branch. It does not provide concessionary finance and assists only large projects.

Arab Investment Company

10. The Company, with paid up capital of S300 million, has headquarters in Riyadh and a branch in Khartoum. It provides equity and loan finance for large scale agricultural, industrial and real estate projects. Minimum investment is set at $250,000 and larger projects are preferred. The Company's present involvement in the Sudan includes a large equity stake in Kenana and a syndicated dollar loan to the Ministry of Transport.

The World Bank

11. The World Bank has a rural development mission in Juba which is currently developing a widely-based rehabilitation scheme involving smallholder production of coffee and other crops and a livestock improvement project, both in the Southern Region. The Bank is also supporting the development of the Western Savannah.

The United Nations Development Programme

12. UNDP is co-ordinating and managing a large number of projects mainly to provide technical assistance. The value of U.N. technical assistance

to agriculture, forestry and fisheries amounted to $8.9 million in 1976.

European Economic Communities

13. The E.E.C.'s assistance to the Sudan is concentrated on small scale agriculture. Capital and technical aid will be provided for a tea production project in the South and integrated rural development in the West, all within the public sector.

The Arab Organisation for Agricultural Investment

14. This regional organisation serving the whole of the Arab world, undertakes technical feasibility studies, provides training and carries out resource surveys, either directly or by use of Arab and non-Arab experts when required. To date the organisation has undertaken 50 studies. Current surveys include an inventory of suitable agricultural investments for foreign interests and feasibility studies for food and livestock production plants.

The Ford Foundation

15. The Ford Foundation has provided finance for a number of basic research studies and training in agriculture and rural development.

FINANCIAL INSTITUTIONS IN SUDAN LOCATED

OUTSIDE KHARTOUM PROVINCE

		Institutions					
Province	Location	AB	BK	CB	NB	SB	UB
Bahr El Gahazal	Wau						X
Blue Nile	Ed Damazeen	X	X	X		X	
Eastern Equatoria	Juba						X
	Yei						X
Gezira	Wad Medani	X	X		X		X
	Hassaheisa		X	X			
	Managil		X				
	Rufa'a		X				
Jonglei	Bor						X
Kassala	El Gadaref	X	X		X	X	X
	New Halfa	X		X		X	X
	El Faw					X	
	El Hawata					X	
	El Soufia						X
	Kassala	X	X				
Lakes	Runbek						X
Nile	Shendi	X	X				
	Atbara	X	X				
	Berber		X				
Northern	Dongola	X			X		
	Karima				X		
	Merowi	X					
	Wadi Halfa						X
Northern Darfur	El Fasher			X			X
	Geneina						X
Northern Kordofan	El Obeid	X	X	X	X	X	
	Omn Rowaba		X	X			
	Er Rahad			X			
	En Nuhud					X	

Key: AB = Agricultural Bank, BK = Bank of Khartoum, CB = Peoples Cooperative Bank, NB = El Nilein Bank, SB = Sudan Commercial Bank, UB = Unity Bank.

Note : Some banks have two branches at one location.

FINANCIAL INSTITUTIONS IN SUDAN LOCATED

OUTSIDE KHARTOUM PROVINCE (Cont)

Province	Location	Institutions					
		AB	BK	CB	NB	SB	UB
Red Sea	Port Sudan	X	X	X	X		X
	Tokar						X
Southern Darfur	Nyala		X	X			X
	Zalingei	X					
	Ed Da'eim				X		
Southern Kordofan	Kadugli				X		
	Babanusa				X		
	Dilling	X	X				
Upper Nile	Malakal						X
	Renk	X					X
Western Equatoria	Yambio						X
White Nile	Kosti	X		X			X
	Ed Dueim	X			X		
Total	42	16	15	10	10	7	19

Key : AB = Agricultural Bank, BK = Bank of Khartoum, CB = Peoples Cooperative Bank, NB = El Nilein Bank, SB = Sudan Commercial Bank, UB = Unity Bank.

APPENDIX H

SOME PUBLIC SECTOR AND JOINT VENTURE INDUSTRIAL PROJECTS UNDER PREPARATION

A Sugar Industry

Sudan has at present three sugar factories (Guneid, Kashm El Girba and Sennar) with total output of about 230,000 tons a year, more than half of domestic consumption. By 1985 however, the country plans to export some 1,000,000 tons. It is possible that sugar could overtake cotton as Sudan's main export. The six new sugar factories envisaged are Assalaya, Kenana, Melut, Mongalla, Rend-Gelhak and Seteit. Out of these, work on the Assalaya factory is in full swing. Work has also started on Melut, Kenana and Mongalla factories. Studies are under way for Renk-Gelhak and Seteit factories.

The Sugar Corporation controls the whole sugar industry with the exception of Kenana which is a limited company. The estates, factories and marketing are under the Corporation's jurisdiction.

(1) Kenana Sugar Project. This is the most important single project in the sugar industry. It is a joint venture between the Government, the Sudan Development Corporation, KFTCIC, Kuwait, the Arab Investment Company, Gulf International Co., Nissho Iwai of Japan, Lonrho and the U.K. The estimated cost of the project is $800 million. The refineries will be located near Kosti (White Nile Province). Sugar cane will be grown in 100,000 acre plantations nearby. The scheme is expected to go into operation in 1980 with an annual production of 300,000 - 350,000 tons after the second year of operation.

(2) North West Sennar Sugar Factory. The factory is situated on the Western Bank of the Blue Nile, about 300 km south-east of Khartoum. The total area under the scheme is 33,000 feddans. Work began on the project in April 1974, and was completed in October 1976. The total estimated cost of the factory is $76 million. The factory is designed to produce 110,000 tons of sugar annually. It will employ around 5,000 workers, seasonally increasing to 20,000 persons. The Kuwait Fund and U.K. sources are providing financing.

B Textile Industry

Sudan is a major cotton growing country, yet it produces hardly 50 per cent of the local demand for cloth. At present, it has only two major textile mills (Sudan Textiles and Khartoum Spinning and Weaving). In 1972, the government drew up a 15-year Plan for development of cotton textiles in three phases, with the first phase aiming at import substitution. Work has started on a number of spinning and weaving factories throughout the country.

(1) The Six Weaving Sheds. These sheds are being constructed by a Belgian group in different rural areas in the North, West and South (Shendi, Kosti, El Dueim, Nyala, Kadugli and Mongalla). They will be fed by Hag Abdalla Spinning factory with their requirements of threads. The cost of each of these sheds is estimated at $17 million. Work started on these factories in early 1976, and target completion dates range from April 1978 to April 1980. Planned production is 9,900,000 metres a year. These sheds are expected to create 1,800 new jobs in the rural areas where they are located. Sudan Development Corporation is participating in the financing.

(2) Hassa-Heissa Friendship Textile Factory. This factory has been constructed in collaboration with the People's Republic of China. It is an integrated spinning, weaving and finishing unit with 25,000 spindles and 854 looms. The cost of the mill is $21.8 million, with financing supplied by China. It is designed to produce 16 million meters of bleached, dyed and printed popular cotton fabrics a year. It has created 2,000 new jobs. The factory has been completed and has started trial production in 1976.

(3) Hag Abdalla Spinning Mill. This project is located at Hag Abdalla Village in Gezira Province. Work is going on the execution of this project by a German firm. The project is designed to produce 7,700 tons of coarse yarns and 2,500 tons of fine yarns per annum, with 72,000 spindles. The total cost is $41.7 million, of which $20 million are financed by Abu Dhabi Development Fund through a long-term loan. Employment created by the project is expected to be 1,500 persons.

(4) Port Sudan Spinning Mill. This project will produce 5,300 tons of fine yarns per annum for export with 72,000 spindles. It is executed by a German Consortium. Total cost is $38.6 million. Employment created by the project will amount to 1,800 persons.

(5) Khartoum North Spinning Mill. It is designed to produce 1,800 tons of fine yarns for export with 25,000 spindles. Work is going further on the execution of the project, in collaboration with the Rumanians and the German Democratic Republic. Total cost amounted to S31.6 million. This project will create new jobs for 750 workers.

C Kenaf Projects

There are two projects, one of which is Abu Naama Kenaf Project and the other is located in the Southern Region at El Tonj. Each of them is designed to produce 10 million sacks and 900 tons of jute per annum, utilizing a farm area of about 30,000 feddans. The cost of Abu Naama Project is $37.6 million and that of Tonj is estimated at $42.8 million. These two projects will create new jobs for 1,500 workers. These projects will meet the domestic requirements of the country.

D Building Materials

(1) The existing capacities of Rabak (White Nile Province) and Atbara (Nile Province) Cement Factories combined are 320,000 tons per annum, while the expected domestic demand for cement in 1985 is estimated to be about 650,000 tons per year. A new expansion of Atbara Cement Factory is now under way, with an additional capacity of 236,000 tons per year, and at total cost of £s13 million. Rehabilitation of Rabak Cement Factory will add 100,000 tons per year with a total cost of DM7.31 million. Also a new factory in Durdaib (Red Sea Province) is under way, with a capacity of 500,000 tons per annum. This is a joint venture between the Sudan and Kuwaiti interests. Estimated cost is $60.6 million, and it will create employment for 1,500 workers. Upon its completion, it will enable the Sudan to export up to 300,000 tons annually of cement to the Gulf States.

(2) Twenty medium-scale brick factories of 10 million per year capacity are to be spread over the country, mainly to create the basis of this industry in the various provinces and to meet local demand. Expected cost is £s8 million.

E Tannery Industry

A new tannery is currently commencing operations in Gezira Province (built by a French firm), with a daily capacity of 1,000 hides and 3,000 skins. It will employ about 370 people. An extension of the White Nile Tannery in Khartoum, to increase its capacity, is under way.

F Central Khartoum Foundry

Expected capacity of 1,500 tons of ingots and employment of 100 in the first phase.

G Natural Gas

Explorations currently being undertaken by multinational companies (including Chevron and Texaco) have resulted in the discovery of two fields of natural gas in the Red Sea in the Port Sudan/Suakin area. The first field is estimated to have reserves of 40 million cubic meters of natural gas: estimates for the second field have not yet been made but it is believed to be several times the size of the first.

Although no detailed plans have yet been prepared for utilization of the gas, the Ministry of Industry is considering several alternatives, including:

(1) supplying power for Port Sudan,

(2) fertilizer production.

H Lime Production

A lime production unit is being considered for Atbara to provide needed lime inputs for the sugar industry, for paints, and for production of

ceramics.

I Pulp and Paper

A pulp and paper factory is being considered for the Damazin area based on eucalyptus, bamboo and/or tropical pine. Estimated demand is 80,000 tons of pulp per year.

J Brewery

Two new brewery projects are being prepared. One will be implemented by a Belgian Company. The second one will be situated in the White Nile Province. It will have a capacity of 20 million bottles a year and employ 350 persons. The total estimated cost is £s2.25 million.

K Fruit and Vegetable Canning

To complement two existing public sector fruit canning projects in Karima and Wau, two additional projects are being prepared with Romanian and Hungarian assistance in the Wad Medani-Khartoum area and in Shendi.